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CONSERVATION ELEMENT
OF THE
COUNTY OF SACRAMENTO
GENERAL PLAN

December 15, 1993

County of Sacramento

Planning and Community Development Department
General and Advance Planning Section

* Revised 8/16/95
refer to Resolution 95-0979

SACRAMENTO GENERAL PLAN
CONSERVATION ELEMENT

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION.	1
SECTION I - WATER RESOURCES	
A. Surface Water Supplies.	3
Growth and Water Supply	5
Additional Water Supplies	6
Shared Water Rights	7
American River Flows.	8
B. Surface Water Quality	11
Urban Runoff Controls	12
Erosion	14
Water Quality Monitoring.	15
Hazardous Materials Disposal.	16
C. Groundwater Resources	17
Groundwater Overdraft	18
Growth and Groundwater.	19
Groundwater Recharge.	21
Rural Residential Uses and Groundwater.	24
Groundwater Quality Monitoring.	25
Underground Storage Tanks	26
D. Water Conservation.	27
Conservation Plans.	28
Water Metering.	29
Conservation and Water Reuse in Project Design.	30
Conservation Values	31
SECTION II - MINERAL RESOURCES	
Introduction.	33
Mineral Resources Protected	34
Resource Evaluation and Management.	35
Extraction of Minerals.	36
New Urban Development and Surface Mining.	37
Aggregates Recycling.	37
Intro	Conservation Element

SECTION III - MATERIALS REUSE

Page

Introduction.	41
Waste Reduction Plan.	42
Residential Participation	42
Recycling Market.	43

SECTION IV - SOIL RESOURCES

Introduction.	45
Development and Agricultural Soils.	46
Oxidation of Delta Soils.	47
Soil Conservation Practices	48
Resource Conservation District Program.	49
Topsoil Mining.	49

SECTION V - VEGETATION AND WILDLIFE

A. Marsh and Riparian Areas

Introduction.	51
Habitat Protection.	52
Habitat Restoration	54
Riverbank Stabilization	56

B. Vernal Pools and Ephemeral Wetlands

Introduction.	59
Vernal Pool Preserves	60
Urban Development and Vernal Pools.	62
Mitigation Banking Program.	63
Vernal Pool Management.	66
Wetlands Regulation Coordination.	67
Community Awareness	68

C. Urban Streams

Introduction.	70
Limitation of Fill in Floodplains	71
Channel Modification.	72
Land Use Adjacent to Urban Streams	74
Maintenance of Urban Streams	76
Restoration of Urban Streams	77

D. Tree Resources

Introduction.	80
Oak Revegetation.	81
Native and Landmark Tree Protection	82
Tree County USA Status.	85
New Urban Trees	86
Urban Tree Management	87

	<u>Page</u>
E. Rare and Endangered Species	
Introduction.	90
Habitat Management.	91
Habitat Protection.	92
F. Fisheries	
Introduction.	94
Water Flows	95
Channelized Areas	96
Water Quality	96
Bank Stabilization.	97
G. Resource Conservation Area	
Introduction.	98
Voluntary Participation	99
 SECTION VI - CULTURAL RESOURCES	
Introduction.	101
Archeologic Site Protection and Development	102
Historic Structure Preservation	104
Destruction of Cultural Resource Sites.	106
Cultural Resource Surveys	107
Artifact Study and Storage.	107
Public Awareness of Cultural Resources.	108
 SECTION VII - BACKGROUND DOCUMENTATION	
A. Water Resources Background Report	
1. Water Purveyors	109
2. Current Supply.	115
3. Current Water Use	125
4. Groundwater Overdraft	129
5. Projected Water Demand.	133
6. In-Stream Water Needs: American River.	137
7. Sources of Additional Water	143
8. Water Conservation.	157
9. References.	167
B. Mineral Resource Background Report.	169
C. Soil Resources Background Report.	179
D. Vegetation and Wildlife	
1. Introduction.	185
2. Wildlife of Special Interest.	187
3. Natural Areas of Special Significance	197
4. Responsibilities and Current Efforts.	208
E. Cultural Resource Background Report	214

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1 Water Purveyors in Sacramento County.	.109
2 Groundwater Recharge from Rain and Applied Water.	.118
3 Annual Recharge from Streams.	.119
4 Annual Groundwater Budget	.119
5 Subarea Sustained Yield Estimates	.120
6 Entitlement and Use of Surface Water.	.122
7 Current (1987) Surface and Groundwater Use in the County. . .	.126
8 Annual Change in Storage for 1962 to 1968	.129
9 Estimated 2015 Water Supply Need (AF/YR).	.135
10 U.S. Bureau of Reclamation Projected Needs for the American River Service Area	.147
11 Contract Schedule for American River and Folsom South Canal.	.149
12 Types of Waste Water Reuse.	.162
13 Existing Waste Water Facilities, Sacramento County.	.164
14 MRZ-2 Sector Analysis	.175
15 Special Status Wildlife Species	.189
16 Rare and Endangered Plant Species	.191
17 Agencies and Interest Groups.	.218



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LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1	Groundwater Recharge Capability	22
2	MRZ-2 Sectors	38
3	Water Districts	.112
4	Sacramento Water Plan: Subarea Map	.113
5	Groundwater Recharge Areas.	.117
6	American River Place of Use Boundary Map.	.123
7	Groundwater Overdraft Areas	.130
8	Mineral Resources	.170
9	Aggregate and Clay Resources.	.171
10	MRZ-2 Sectors	.174
11	Potential Aggregate Mining Areas: Mather AFB	.177
12	Cultural Resources Sensitivity.	.216

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

INTRODUCTION

MAJOR GOAL: Natural resources managed and protected for the use and enjoyment of present and future generations while maintaining the long-term ecological health and balance of the environment.

The County recognizes the need for effective conservation practices which allow for the maintenance and preservation of its natural environment and efficient use of its resources. The state too recognizes this need and mandates that the County's General Plan include a Conservation Element which will enable the County to analyze its resources and determine policies for their use and conservation. State law requires that the element address the management and protection of specific resources:

The Water Resources section addresses the County's objectives with respect to the use of ground and surface water for residential, commercial, and agricultural purposes. The section assesses how and from where the County intends to secure its future water supply and provides guidelines for the County's policies on water quality, ground and surface water use, and water conservation.

The Mineral Resources section delineates the County's policies on the protection of mineral resources for economic extraction while providing guidelines on how, when, and where mineral resources can be extracted to avert adverse impacts on the environment.

The Materials Reuse section specifies the County's plan of reducing the amount of solid waste that is produced. It includes policies and programs which will encourage participation in the recycling of materials and sets guidelines for establishing a sustainable market for recycled materials.

The Soil Resources section discusses the management and protection of county soils for purposes of maintaining its resource value and agricultural potential. The section deliberates on the County's future plans in dealing with the loss of agriculturally productive soils and discusses policies and programs which will encourage the utilization of effective soil conservation practices.

The Vegetation and Wildlife section consist of six subsections, each of which discusses the preservation and management of biotic resources. The Marsh and Riparian Woodlands and Vernal Pools subsections identify these ecologically sensitive habitat areas, and set guidelines for protecting, managing and restoring these habitat areas. Likewise, the urban streams subsection discusses policies with respect to floodplain modification and associated environmental impacts. The Trees subsection reviews plans for protecting and preserving native and landmark trees while increasing the number of trees planted in urban areas of the county. The Fisheries subsection addresses

objectives in terms of the protection and management of the County's fisheries and lays out policy to enhance fish propagation and migration for anadromous species. The Threatened and Endangered Species subsection establishes guidelines for identifying rare or endangered species and managing existing areas with a sensitivity for these species.

The Cultural Resources section discusses County objectives with respect to the protection and preservation of important archeologic and historic sites and plans for increasing public awareness and appreciation of them.

The goals, policies, and objectives of these sections have been developed so as to be congruous with the goals of the Conservation element itself, which envisions: 1) the County's diverse resource base managed and protected for the use and enjoyment of present and future generations; 2) the ecological health and balance of the environment maintained over the long-term, and 3) development of the county managed so as not to damage the environment. Because the County recognizes the sometimes inherent conflict between conserving and protecting resources while still managing them for public use and enjoyment and protecting public health, the policies established in the various sections of the conservation element have been developed so as to address this conflict.

To the greatest extent possible, the various sections of the element have been designed to distinguish between the management of finite resources necessary to support development and the preservation of other resources threatened by the path of development. The Water Resources, Materials Reuse, and Mineral Resources sections can be thought of as those resources which are necessary to support development, and the Vegetation and Wildlife, Cultural Resources, and Soil Resources sections are those threatened by the course of development.

The resources which state law mandates the conservation element include have been addressed in the six sections mentioned above, yet the element does not include three additional resources which could also go under this heading. The Air Resources section, for example, is addressed in The Air Quality element. Although previous general plans have included Energy and Scenic Resources elements, the information necessary to include them in this Draft Conservation Element remains to be completely updated and compiled. The County will undertake their updating and incorporation in the General Plan as a first priority during the coming months.

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION I

WATER RESOURCES

A. SURFACE WATER SUPPLIES

GOAL: Conjunctive use of surface and ground water to provide long-term water supply for Sacramento residents while maintaining river flows and reservoir levels which protect environmental resources and provide substantial recreational benefits.

INTRODUCTION

Unlike other regions of the state, Sacramento County is blessed with an abundance of surface water. Sacramento's namesake river - the state's largest and longest - flows wide and deep along the county's western edge and provides water for municipal, commercial, agricultural, and recreational uses. The clear blue American River tumbles down from the high Sierra-Nevada carrying an average 2.6 million acre feet (AF) of water per year to its confluence with the Sacramento River. (An acre foot of water is the amount of water it takes to cover one acre of land to a depth of one foot). The much smaller and still undammed Cosumnes River, with its origins in the Sierra foothills, irrigates an agriculturally productive floodplain and in its lower reaches, near its confluence with Dry Creek at the Mokelumne River, supports nationally significant wetlands and riparian areas.

Folsom Dam, the major dam on the American River, has a maximum storage capacity of one million acre feet of water in Folsom Lake, which is a major source of surface water for the region, provides critical flood protection, and attracts thousands of recreational enthusiasts from throughout the region. Below the Dam the 30 mile long American River Parkway, Sacramento's most significant urban open space, provides residents and visitors with miles of riding, hiking and bicycling trails, and swimming, rafting, canoeing, and fishing opportunities.

Water diversions from the lower American River to meet the needs of our expanding metropolis have the potential to seriously impact recreational attributes and migratory fisheries. Loss of these river related resources has been a point of contention, delaying water distribution plans. While major progress in adjudicating diversion disputes has been made, much remains to be accomplished. Meanwhile, Sacramento continues to grow, and the unincorporated area, lacking the City's abundant riparian and contract rights to water from both the American and Sacramento Rivers, has drawn extensively from declining ground water resources.

Other surface water sources to consider are the various streams flowing through the county. However, even the larger streams such as Morrison and Dry Creeks contain only limited water which is claimed, in part, by those holding riparian rights or is considered essential for in-stream values. Additionally, dams have been considered on some streams and rejected due to low water yields which can not justify high project costs.

The Delta, formed by the meeting of the Sacramento and the San Joaquin Rivers, is a low-lying area interlaced with numerous tidal sloughs distinguished from the sunken peat islands by an extensive levee system. These waterways are an important biological nursery, provide water for productive Delta farms, and are one of the State's foremost recreational boating areas.

Not surprisingly, Delta waterways and the American River have been the focus of many of the state's well-known, controversial and protracted water resource debates. The Delta is a major transfer point for State Water Project water headed for the San Joaquin Valley and Southern California. Huge pumps deliver water into the aqueduct at Tracy. As Southern California's water needs increase, and as growth in Sacramento and other Northern California communities requires additional diversions, there is growing concern that flows reaching the Delta will be insufficient to prevent salt water intrusion, flush the Delta of pollutants, supply fresh nutrients, and in general maintain the ecological health of this rich and vital estuary. Preservation of Delta water quality has been under study for several years by the State Water Resources Control Board, which will ultimately recommend Delta water policy.

The General Plan for Sacramento's surface water resources reflects the conflicting water needs which have shaped the water debates of the last 30 years. The policies and programs below articulate an overall plan for achieving environmentally sound and economically productive water use programs. Many are policies previously adopted by the Board of Supervisors or are implementation efforts currently underway. Their linkage with the ground water, water quality, and water conservation policy sections, represents in one document, the compilation of the County's first comprehensive strategic water policy plan.

The policies and programs focus on utilizing surface water supplies of the American River to meet the county's water needs, yet emphasize the protection of its vital biological and recreational attributes. Because the Delta and the San Francisco Bay Estuary are multi-county areas where flow requirements and water use issues will ultimately be resolved by the State, the County General Plan recognizes that these mitigation measures may ultimately impact water supplies. However, it defers to the State Water Resources Control Board for policy guidance. The County will plan for water supply and conservation giving consideration to a healthy estuary.

The following surface water management objectives are described in this section:

1. Balancing future growth and available water supply.
2. Guaranteed, adequate, long-term surface water supply.
3. Full utilization of Sacramento City's water rights to meet urban growth needs.
4. Adequate flows in the American River to protect in-stream values.
5. Accurate monitoring and forecasting of water use and needs.

Finally, note that protection of surface water resources involves much more than minimum flows and supply considerations. Floodplain fill, levee maintenance, riparian and wetland protection, marina development, boating controls, runoff and sewage treatment, all affect the overall quality of our water resources. Additional relevant policies are found in the Conservation Element under surface water quality; urban stream corridors; marsh and riparian areas; and fisheries. The Recreation Element also addresses waterways development. Flood protection issues are considered in the Health and Safety Element.

GROWTH AND WATER SUPPLY

Objective: Population and economic activities shall be planned to grow at a rate which will not exceed the capacity of dependable water supplies, in conjunction with safe ground water yield.

Intent: The prevailing public perception is that Sacramento has abundant water to accommodate long-term growth needs. However, while the water may be there, flowing daily through the metropolitan area, the rights to use it are not at all certain and numerous other entities have asserted their claims for its use. Meanwhile, the State has established and courts have upheld the need to maintain water flows benefitting fishery and recreational uses in the Lower American River and Delta. It is important to recognize that water may someday constrain the county's overall growth and to begin to determine what that limit might be. These policies provide a basic framework relating growth and water supply. As time progresses they will become more important. In the interim we must endeavor to implement the County's water supply strategy and better ascertain our future needs, the role of conservation and reuse, and future options.

Policies:

- CO-1. Long range plans for accommodating population and economic growth shall not be based on the assumption of additional supplies from future storage facilities on the Sacramento, American or Cosumnes River unless the projects are approved and funding secured.

ADDITIONAL WATER SUPPLIES

Objective: Adequate guaranteed long-term surface water supply to meet future needs within the unincorporated area.

Intent: Urban development in unincorporated Sacramento County has long depended on ground water pumping to meet its growing domestic water needs. This has resulted in significant ground water overdraft problems in the northeast area around McClellan Air Force Base, in Galt, and Elk Grove. Ground water levels in these areas during the spring of 1992 were 20, 40, and 70 feet, respectively, below their original levels. An adequate guaranteed long-term surface water supply to meet the needs of areas with ground water overdraft problems and accommodating future growth is essential. These policies establish the County's intent that the Sacramento County Water Agency (SCWA) be the primary water contracting agency with the Bureau of Reclamation (USBR) in obtaining surface water for distribution. In this role SCWA must monitor the growth of water needs and a myriad of water supply issues involving competing interests. The SCWA and USBR have agreed that there is a need for 213,000 AF/vr. of unallocated water stored in Folsom Reservoir to serve Galt and unincorporated Sacramento. The USBR has delayed negotiating contracts for these surface waters pending resolution of environmental issues and concerns. The Department of the Interior has withdrawn the most recent Draft Environmental Impact Statement and there is no indication when the process will resume.

The County and City have adopted a Memorandum of Understanding (MOU) to facilitate an agreement to establish a cooperative and conjunctive water use program. A new office, the City-County Office of Metropolitan Water Planning (CCOMWP), has been created to meet the region's water needs over the next 10 to 15 years. The office has Drafted a memorandum of agreement, signed by the County, City, and the Sacramento County Water Agency, which sets forth a seven and one-half year work plan to develop a technical facilities plan for the distribution of water within metropolitan Sacramento County, develop a financing plan for the facilities, and create an agency or organization to implement the plan for the long-term. To this end, the city is conducting a study to determine additional capacity needs at its water treatment facilities, and the County is negotiating to obtain an additional 22,000 acre feet from the U.S. Bureau of Reclamation. The Office is also seeking alternatives for providing additional supplies to meet short term needs outside the city's Place of Use.

The Water Policy Statement adopted by the Board of Supervisors on August 10, 1993, provides further policy direction for development of additional water supplies.

Policies:

CO-2. In new growth areas, until such time as the water plan being developed by the CCOMWP provides for an alternative contracting authority, the Sacramento County Water Agency (SCWA) shall be the primary contracting

agency with the United States Bureau of Reclamation to obtain additional surface water for delivery to new growth areas in the unincorporated area, where the SCWA will be the purveyor.

- CO-3. SCWA shall continue to work with the area water purveyors to develop a conjunctive use program and assist other purveyors in obtaining surface water necessary to implement conjunctive use.
- CO-4. SCWA, working in conjunction with the CCOMWP and the area water purveyors, shall every five years reevaluate water needs based on long-term growth consistent with the General Plan.

Implementation Measures:

- A. Prepare updated water needs report. (SCWA)
- B. Monitor water development and management activities in the Delta and adjoining counties and report annually to the Board on matters which might beneficially or adversely affect Sacramento County. (SCWA)
- C. Secure a contract with USBR for 22,000 AF of firm water for SCWA and 13,000 AF of firm water for San Juan Suburban Water District in compliance with the provisions of Public Law 101.514. (SCWA)
- D. Conduct an evaluation of alternative means for meeting the immediate water needs of Sacramento County and identify specific measures to incrementally secure additional surface water supplies. (SCWA)
- E. Monitor issues affecting the USBR water contracting program, and secure a contract to provide for additional firm supplies from Folsom reservoir at the earliest possible date. (SCWA)

SHARED WATER RIGHTS:

Objective: Full utilization of Sacramento City's water rights to the American and Sacramento Rivers to meet urban growth needs.

Intent: Sacramento City currently has rights and entitlements to a maximum of 245,000 AF/yr. of water from the American River and 81,800 AF/yr. of water from the Sacramento River. The City is contractually obligated to supply 15,000 AF/yr from the American River entitlement to Sacramento Municipal Utility District (SMUD) for use outside the authorized place of use. The use of both these sources of water is restricted to certain areas of Sacramento County. Sacramento River water can only be used within the City limits and American River water can only be used within its Place Of Use, roughly bounded by the Sacramento River, Calvine Road, Bradshaw Road, and Elkhorn Boulevard. Currently, the City uses a total of approximately 100,000 AF/yr. Typically, the City has tended to balance the diversions equally between the American and Sacramento Rivers.

In 1988, the City and County executed an MOU to facilitate negotiations on an agreement to establish a cooperative conjunctive use water program. Under the MOU, the City undertook and is completing water sufficiency studies. The studies will determine the ultimate water needs of the lands within the place of use at full build out conditions and how much of the needs can be met by water conservation and ground water. These studies, when completed will determine to what extent the existing entitlements exceed the ultimate surface water needs of the place of use and will also determine if the authorized place of use can be expanded without reducing existing contractual guarantees on water deliveries and water cost to users in the current place of use. If the existing benefits can be guaranteed, the CCOMWP will then develop a plan for delivering water to an expanded place of use. The changed place of use must then be approved by the State Water Resources Control Board (SWRCB).

The Natomas Mutual Water Company provides agricultural water to farmland within the Natomas area. The water rights of a mutual water company are typically held by the individual property owners who are also share holders in the mutual company. Certain lands within the Natomas Mutual Water Company are proposed for conversion to urban uses by the Draft General Plan. The associated water rights of these properties should be secured for use in meeting urban needs.

Policy:

- CO-5. Assist the City of Sacramento in efforts to perfect its water rights within an expanded place of use with the SWRCB and defend against competing claims from other interests outside of Sacramento County.
- CO-6. Require that as properties which have water entitlements are converted to urban uses, the water entitlements are also converted so they can be used to meet the needs of the urban area.

Implementation Measures:

- A. Find a means to ensure the City of Sacramento's existing WBR contract would not be subject to renegotiation as a result of a change in the place of use of the City entitlements.
- B. Upon successful completion of A, develop a plan for distributing water to an expanded place of use. (CCOMWP)
- C. Apply to the SWRCB for an amended place of use consistent with the plan developed under Measure B of this section. (SCWA and City)

AMERICAN RIVER FLOWS

Objective: Adequate water flows to protect riparian, fisheries, and recreation values in the American River.

Intent: Sacramento County and City established the American River Parkway in recognition of its outstanding natural resource value and prime recreational

assets. Sacramento County recognized the need to maintain adequate flows for recreation (rafting, fishing, swimming, etc.), fishery productivity, and the general health and aesthetic values of the river early in the development of the Parkway. The County sought court action to enjoin the East Bay Municipal Utilities District (EBMUD) from withdrawing Central Valley Project (CVP) water above the Parkway rather than downstream from the Sacramento after the water flow had benefitted fish and recreation. After years of litigation the court settled the case by granting EBMUD the right to withdraw its CVP water above the Parkway but only as long as the specific in-stream flows set by the Court are met. The General Plan incorporates these flows as County policy for minimum flows in the Lower American Rivers. It will provide a guide for planning diversion facilities and schedules for American River surface water supplies secured by SCWA under USBR contract, and the development of cooperative agreements with Sacramento City and other water purveyors with the capability of diverting water from the mouth of the American River or from the Sacramento River when the resulting American River flows would be less than the minimum requirements.

With respect to Policy CO-7, the County of Sacramento has accepted the so-called Hodge Flows for the purpose of resolving that litigation only, and only to the extent that the County determined, on balance, that it would not appeal the judgement in that litigation. Sacramento County still maintains that there should be no diversion for export from the Folsom-South canal. Sacramento County does not accept the premise that diversions from the lower American River are necessarily acceptable at times when flow levels set forth in the Hodge decision are instantaneously met.

The in-stream flows established by the Court apply only to EBMUD's diversion. Revised minimum flow standards for other water users can only be established by the SWRCB, which initiated, but has not completed a review of the Bureau of Reclamation and City of Sacramento's water rights with the objective of establishing new minimum flow requirements based on currently available scientific knowledge.

Sacramento County maintains that the flow levels identified in Policy CO-7 are for the protection of the lower American River. Sacramento County also recognizes that flow-related conditions allowing diversions must be translated into operational terms. Sacramento County shall urge the Court in the above referenced litigation to immediately begin work to develop actual operational conditions for any EBMUD diversion and shall move forward immediately and continually in all appropriate forums to insure that operational constraints, in keeping with the above, on facilities associated with the lower American River are mandated. For all practical purposes, this may mean that, to the extent diversions from the lower American River are allowed, such diversions will be limited to times when Folsom Dam is spilling. Sacramento County shall oppose all diversions from the lower American River that do not adhere to this policy, but will work with other entities within counties, watersheds, and areas of origin, as defined by California law, to assist in developing programs, including programs for the diversion of American River water, which adhere to the intent of the Policy CO-7.

There is a difference between the City and the County's view of whether or not the resource and recreational values of the Lower American River can be adequately protected and balanced with other needs if additional water diversions are allowed. In light of the developing partnership between the City and County, there is a clear need to develop a common local position on the location of future diversions. Furthermore, whatever the local position may be, it will only apply to other water users if it is consistent with new minimum flow standards set by the SWRCB.

The Water Policy Statement adopted by the Board of Supervisors on August 10, 1993, provides further policy direction on American River flows.

Policies:

- CO-7. Divert surface water only when flows are sufficient to maintain minimum flows consistent with the ERMUD Court ruling of :
- 2,000 cfs October 16 through February
 - 3,000 cfs March through June
 - 1,750 cfs July through October 15
- in the Lower American River between Nimbus Dam and its confluence with the Sacramento River.
- CO-8. Facilitate the initiation of SWRCB's review of the Bureau of Reclamation and the City of Sacramento's water rights on the Lower American River.

Implementation Measure:

- A. Prepare a position paper which provides a summary of current knowledge of environmental, technical, cost, and legal issues related to the location of additional water diversion from the Lower American River. (CCOMWP)
- B. Initiate joint workshops with the City Council with the objective of developing a common local position on the location of future diversions from the American River. (CCOMWP)
- C. Working with the Bureau of Reclamation, develop the technical information necessary for the SWRCB to convene hearings on the Bureau and City of Sacramento's Lower American River water rights. (CCOMWP and USBR)

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION I

WATER RESOURCES POLICIES

B. SURFACE WATER QUALITY

GOAL: Surface water quality which promotes a healthy aquatic environment, and is safe for public use and enjoyment.

INTRODUCTION

Numerous studies have documented that urban runoff contributes significant levels of pollutants to receiving waters. Contributing factors include increased impervious surfaces, increased concentrations of non-point source pollutants, septic tank leach fields, high nutrient loads from pastures, and improper sediment control during grading of new developments. Reduction in permeable surface area has limited percolation and associated filtration processes beneficial to water quality. Increases in grease, oil, dust, and fine solids found on roofs, drives, and roads have added toxicity to runoff and have been shown to impact, among other things, aquatic habitat. Runoff from agricultural/residential parcels where horses and other large animals are corralled can increase nutrient loads, promote algae growth and decrease oxygen supplies in nearby watercourses. Lastly, increased erosion from improper sediment control during grading techniques in newly developing areas has increased suspended sediment load in surface waters.

National studies conclude that discharge of stormwater runoff is one of the main, non-regulated sources of pollutants in surface waters. Although documentation is not extensive, there is evidence that Sacramento County waterways and water bodies are being degraded by accumulations of toxic chemicals, nutrients, and sediments in storm water discharge. Local studies have documented a seasonal flush of metals, oil, and grease into surface water courses and water bodies following seasonal storms. To this end, in 1987 the Federal government amended the Clean Water Act to formulate a new program under the National Pollutant Discharge Elimination System (NPDES), which establishes a process whereby state agencies regulating water quality issue permits to legal entities, such as the County, to develop, administer, implement, and enforce runoff management programs within their own jurisdiction. As a legal entity and permit holder, the County will regulate harmful constituents of storm water runoff, including non-point source pollutants and sediment runoff, target potential sources of pollutants, and develop mechanisms to control and monitor discharge of urban runoff. The Environmental Protection Agency and the California Regional Water Quality Control Board have promulgated regulations

detailing management criteria and water quality standards which are to be implemented by local entities. Sacramento County and City, along with Folsom and Galt, having joined in a regional Memorandum of Understanding, fell under the jurisdiction of this new permitting program in 1990.

This section describes policies and programs under four objectives

1. Cost-effective urban runoff controls using best management practices to limit toxic chemicals and nutrients entering receiving water of the state and reduce the amount of toxics stored in areas exposed to flood hazards.
2. Minimal erosion from new development in urban areas.
3. Comprehensive monitoring of surface water quality by coordinated state and local effort.
4. Disposal of hazardous materials so as not to adversely effect surface water quality.

The Urban Stream section of this Element contains additional policies and programs pertaining to stream water quality.

URBAN RUNOFF CONTROLS

Objective: Cost effective urban runoff controls using best management practices to limit toxic chemicals and nutrients entering receiving waters of the state and reduce the amount of toxics stored in areas exposed to flood hazards.

Intent: As noted above, urban stormwater runoff discharges contain non-point source pollutants that lower the quality of receiving waters. Water quality management practices aimed at curtailing unhealthy storm discharge should evaluate existing water quality impacts from urban runoff and implement programs to separate, to the maximum extent practicable, pollutants from the discharge system. The permitting process newly established by the federal and State government requires that the County establish an urban runoff management plan incorporating best management practices. These policies and programs provide General Plan support for that effort. They also incorporate policies and implementation measures from the adopted Hazardous Materials Element and a separate evaluation of agricultural/residential runoff controls. Inclusion of urban runoff control strategies in community plans is appropriate to the extent that retention ponds or collection basins may serve as community runoff control facilities; community plans will not need to incorporate the full range of county-wide programs to the urban runoff management plan.

Policies:

- CO-9. Community and specific plans shall specify urban runoff control strategies and requirements, consistent with Master Drainage Plans and Public Work's urban runoff management program, for development in newly urbanizing areas and identify sites where retention and treatment are warranted consistent with discharge permit requirement and county-wide runoff measures.
- CO-10. Development within newly urbanizing areas shall incorporate runoff control measures in their design or participate in an areawide runoff control management effort consistent with the urban runoff management program developed by the Public Work's Department.
- CO-11. Hazardous materials shall not be stored in the 100 year floodplain in such a manner as to pose a significant potential for surface water contamination.
- CO-12. The concentration and management of large animals on residential and agricultural-residential parcels shall be such that pasture runoff does not contain excessive nutrient concentrations which would contribute to surface water quality degradation.

Implementation Measures:

- A. Develop a management plan which establishes objectives, strategies, and control measures for urban runoff in developed and newly developing areas based on state and federal permit and discharge requirements. The plan should include options for minimizing and removing non-point source pollutants, such as grease, oil, dust, and fine solids concentrated in runoff flowing from streets, roofs, and yards. (City and County Public Works and Planning)
- B. Incorporate urban runoff control strategies and requirements into community plans as they are updated. (Planning)
- C. Adopt and implement the policies and programs of the draft Hazardous Materials Element. (Planning, Health, Public Works, Agriculture, Air Pollution Control District (APCD))
- D. Identify acceptable nutrient levels for agricultural residential pasture runoff, determine circumstances which lead to high nutrient loading, assess extent of problem in Sacramento County, evaluate runoff containment and livestock management measures to minimize nutrient laden runoff, assess landowner impacts and develop implementation recommendations. (Planning and Environmental Management Department)
- E. Evaluate and amend the zoning ordinance pertaining to large animal requirements on residential and agricultural residential parcels as necessary to ensure acceptable runoff quality. (Planning)

- F. Establish a system of pollution abatement fees based on the potential peak runoff and land use, evaluate potential mitigation measures for reducing the runoff and/or removing pollutants and provide for appropriately reduced fees. (Planning and Public Works)

EROSION

Objective: Minimal erosion from new development in urban areas.

Intent: Increases in storm runoff sediment load from grading practices which encourage erosion have decreased water quality by clogging channels, destroying aquatic habitat and increasing water treatment costs. The Environmental Protection Agency has estimated that sediment runoff rates from construction sites without adequate erosion control measures, are typically 10 to 20 times that of agricultural lands. Over a short period of time, construction sites can contribute more sediment to receiving water than was previously deposited over several decades. Construction-related erosion is not as significant in Sacramento as elsewhere due in part to the matrix of area soils and the lack of significant topographic relief. Nevertheless, the County will need to modify its grading ordinance to improve erosion controls. As part of the NPDES permit requirements these policies provide basic policy direction. Programs to improve slope landscaping requirements and mitigation monitoring procedures supplement the County's principal implementation effort.

Policies:

- CO-13. Roads and structures shall be designed, built and landscaped so as to minimize erosion during and after construction.
- CO-14. Roads and structures shall be designed to minimize grading on slopes above 20 percent.
- CO-15. Erosion protection measures and on-site ponding shall be required for all borrow pits and surface mining operations.

Implementation Measures:

- A. Evaluate and amend grading ordinance as necessary to improve implementation effectiveness and to be consistent with Plan policies and state discharge permit requirements. (Public Works)
- B. Develop landscape requirements for slopes above 20 percent and amend Zoning Code as necessary. (Planning)
- C. Develop procedures for erosion control mitigation monitoring. (Planning and Department of Environmental Review and Assessment (DERA))

WATER QUALITY MONITORING

Objective: Comprehensive monitoring of surface water quality by coordinated state and local effort.

Intent: The Delta, the Sacramento, American, Cosumnes, and Mokelumne Rivers, and associated tributaries supply water to municipal, industrial, and agricultural users. In addition, county water courses provide water oriented recreation, routes for migrating fish, habitat for resident species, ground water recharge, freshwater replenishment, and aesthetic enjoyment. The economic and social benefits of protecting the quality of receiving waters is important to the entire county area. Continued urban expansion necessitates diligent monitoring and evaluation of surface water quality by governing authorities. To maintain and enhance the economic and biologic viability of surface waters, local and state agencies should develop and implement coordinated programs that aim at monitoring receiving water quality and isolating the causes of any degradation. It is appropriate that the State of California participate in water quality monitoring in the Sacramento, American, and other multi-county waterways.

The Sacramento Region County Sanitation District (SRCSD) embarked upon a Coordinated Monitoring Program in 1991 funded jointly by the SRCSD (50%), City of Sacramento (25%), and Sacramento County Water Agency (25%). The cost of the first year's program gets underway, the average cost would be \$500,000 per year over the first five years of the program.

The purpose of the Coordinated Monitoring Program was to 1) coordinate water quality monitoring efforts currently underway in the American and Sacramento Rivers within the ambient water quality monitoring program in the Sacramento and American Rivers, 3) design, install and manage a coordinated data base for water quality monitoring results for the rivers, and 4) recommend additional monitoring programs which may be necessitated by future regulatory requirements.

Policies:

CO-16. Encourage the County and Cities of Folsom, Sacramento, and Galt to jointly participate in a long-term water quality monitoring program for receiving waters within the county.

Implementation Measures:

- A. Develop a comprehensive water quality monitoring plan and determine costs. (Public Works)
- B. Evaluate the feasibility of assessing water user fees and/or other sources to fund surface water quality monitoring and develop necessary legislation. Implement local funding and seek supplemental state and federal grants. (Public Works)

C. Implement monitoring program. (Public Works)

HAZARDOUS MATERIALS DISPOSAL

Objective: Disposal of hazardous materials so as not to adversely effect surface water quality.

Intent: Improper disposal of hazardous materials degrade surface water quality. Unfortunately, many citizens are unaware that material disposed of on the ground, in a backyard pit, or into gutters eventually enters the water supply. Water treatment operations to remove such pollutants from surface water supplies are prohibitively expensive. The more cost-effective solution lies in developing programs to educate the public on proper disposal methods of hazardous materials to curtail water contamination, and when necessary prosecuting negligent activities.

Policy:

CO-17. Inform the community on laws governing the proper handling of hazardous materials.

Implementation Measures:

- A. Develop an educational program to inform businesses and individuals on water quality degradation from improper disposal of hazardous materials. (Environmental Management Department)
- B. Aggressively pursue enforcement of laws applying to illegal hazardous materials disposal. (Environmental Management Department)
- C. Investigate illegal handling and disposal of hazardous materials. (Environmental Management Department)
- D. Prosecute illegal handling and disposal of hazardous materials. (District Attorney)

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION I

WATER RESOURCES

C. GROUND WATER RESOURCES

Goal: Adequate long-term quantity and high quality of ground water resources for both human and natural systems.

INTRODUCTION

Sacramento County, in the middle of the Central Valley, is located over the north central portion of California's Central Valley ground water basin. This extensive aquifer extends some 400 miles from Red Bluff to Bakersfield and averages 40 miles in width. The Central Valley aquifer is a complex system of different ground water basins composed of stratified sand, silt, and clay layers many thousands of feet thick. However, the average depth of strata bearing fresh water is 600 ft. below the surface. These deposits have been accumulating over the last 100 million years and are underlain by impervious bedrock. The important water-bearing sediments from oldest to youngest are, the Ione Formation, the Valley Springs Formation, the Mehrten Formation (the most productive formation), the Laguna Formation, the Fair Oaks Formation, the Arroyo Seco Gravels, and the Victor Formation. The portion of the Great Valley aquifer which underlays Sacramento County has an estimated capacity of more than 30,000,000 acre feet of fresh water.

Early settlers in the Sacramento Valley tapped into the ground water supply for irrigation and domestic use. The water table level remained fairly constant until about 1940, but from 1941 to 1970 the water level declined a little over one foot per year. Recharge is sufficient to resupply withdrawals only in the areas near the floodplains of the Sacramento, American, and Cosumnes Rivers. Away from these areas regular withdrawals have led to overdraft and cones of depression in the ground water tables. Increased irrigation in the middle part of the 20th century initiated the decline, particularly in Galt and Elk Grove. Increased urban development in both of these areas has compounded overdraft problems.

Long-term quality and availability of ground water for Sacramento area residents is dependent on two requirements: stabilizing ground water levels and keeping contaminants out of the aquifer. A stable water table requires the conjunctive use of surface water and ground water as well as the undiminished annual replenishment or recharge of the water table. The County's 1978 Water Plan outlined key elements for achieving a stable ground water table and recognized the need to draw from surface water sources. Ground water alone

cannot provide the county with needed water, and postponement of surface water agreements continues the accelerated rate of ground water depletion, to the point where the County may consider policies which would link further urban development to surface water availability and quality.

Much concern exists over long-term migration of toxic substances leaching from military and industrial operations into the aquifer. In addition, the proliferation of rural residential lots sewerred by septic systems generate sufficient nitrates in seepage to cause concentrations in ground water which exceed safe drinking water standards.

Policies and programs in this section address these issues under the following Policy Objectives:

1. Elimination of ground water overdraft.
2. Growth managed to protect ground water resources.
3. Understanding of ground water recharge and protection of recharge areas.
4. Ground water for domestic consumption which meets drinking water standards.
5. Agricultural-Residential land uses regulated so that nitrates from septic systems do not impair ground water quality.
6. County-wide monitoring of ground water quality.
7. Curtailed hazardous material seepage from underground storage tanks.

GROUND WATER OVERDRAFT

Objective: Ground water overdraft eliminated by the year 2000 and a balanced ground water table thereafter.

Intent: The best available estimate of safe yield, the amount of ground water which can be withdrawn without depleting present ground water levels, is 357,000 AF/yr. A 1987 estimate of ground water pumped for domestic uses and irrigation is 380,000 AF/yr. Average overdraft for the Sacramento Area is currently 0.5 foot/yr. Ground water levels have dropped approximately 35 feet since 1930, from an average water table elevation of 30 feet above sea level to 5 feet below sea level. Three major areas with considerable overdraft problems are the northeast area around McClellan Air Force Base, the south area around Galt, and an area around Elk Grove. The worst area is Elk Grove with its rapid urban development and total dependence on ground water, where water tables are as much as 70 feet lower than they were when pumping began.

This objective, to eliminate overdraft by the year 2000, was established by the County Water Plan adopted in 1978. However, the County cannot implement it until a source of surface water is secured and conveyed to overdraft areas. Water once intended for use at Rancho Seco may be the best option for surface water relief in the near term. It should be a top priority of the County to pursue an agreement with all involved agencies. Note that the term 'intermittent' as used in CO-19 refers to increases in available federal and

state contract water resulting from seasonal runoff. The policies and programs below for implementing conjunctive use of surface and ground water in the unincorporated area are consistent with the County's established approach.

The Water Policy Statement adopted by the Board of Supervisors on August 10, 1993, provides further policy direction on curtailing groundwater overdraft through conjunctive use.

Policies:

- CO-18. Work with area purveyors to investigate and implement a conjunctive use program between groundwater and surface water supplies, consistent with meeting the in-stream flow requirements of the American River.
- CO-19. Utilize intermittent water in conjunctive use with ground water in agricultural areas.

Implementation Measures:

- A. Seek immediate agreement with SMUD and USBR for utilization of 60,000 AF/yr of SMUD contract water to partially relieve ground water overdraft in Zone 40. (SCWA)
- B. Working with purveyors establish ground water management zones and levy extraction fees consistent with the Sacramento Country Water Agency in order to equitably assign both surface and ground water costs. (SCWA)
- C. Expand program for monitoring ground water withdrawals and determining when overdraft is occurring. (SCWA)
- D. Prepare a biannual report on ground water use, including a map of ground water elevations. (SCWA)
- E. Working with purveyors identify and prioritize areas to receive surface water for ground water overdraft relief and define zones of benefit. (SCWA)
- F. Working with purveyors develop comprehensive use plans for each zone of benefit. (SCWA)

GROWTH AND GROUND WATER

Objective: Growth managed to protect ground water quality and supply

Intent: Sacramento County has been continually frustrated in meeting its safe yield objective by the inability of all involved agencies to resolve disputes over water rights and contracts for available American River water. In the meantime, growth has increasingly shifted to the south area of the county, where ground water pumped for farmland irrigation has created a

long-standing overdraft problem. A current backlog of approved and unbuilt residences in Zone 40 (see Water Districts Map on page 112) is causing increasing public concern that the ground water supply will be exhausted before surface water is finally delivered to the area. Moreover, the County's past growth management policy in overdraft areas has become an issue in City-County negotiations for sharing water rights. The County cannot continue to approve development in the south area while ground water is the only source of water. Policy CO-20 is a key General Plan policy which must be strictly enforced. It applies to areas previously identified for non-urban uses that are within the Urban Area established by this Plan. Policy CO-20 applies to all new commercial and residential development.

Limited ground water is a constraint for Rancho Murieta, which is dependent on winter diversions and storage from the Cosumnes River and is already approaching full utilization of available water entitlement. The Rancho Murieta Community Services District (CSD) proposes augmenting their supply with ground water during drought years. The County will need to coordinate development approval with the CSD system expansion in implementing these policies.

The State sets quality standards for potable water from all sources of water which are used for domestic purposes. Ground water is often much purer than surface water as it has filtered through overlying sediments. However, contaminants can leach into the aquifer and, if present in unacceptable levels, require expensive treatment or render the water unfit for consumption. Generally, deeper aquifers receive less contamination than shallower ones (although some deep aquifers can have unacceptable levels of hydrogen sulfide, magnesium, and other salts where the geological formation is composed of marine sediments). The policies and implementation measures below reflect the County's regulatory approach to ensure acceptable ground water quality.

Policies:

- CO-20. In new development areas, as identified in Figure III-1 of the Land Use Element, entitlements for urban development shall not be granted until a Master Plan for water supply has been adopted by the Board of Supervisors and all agreements and financing for supplemental water supplies are in place. The land use planning process may proceed, and specific plans and rezoning may be approved.
- CO-21. The Master Water Plan shall include three planning objectives which direct the Plan to consider alternate conservation measures, achieve safe yield of ground water supply in conjunction with development in new urban growth areas, and formulate a five year monitoring program to review water plan progress.
- CO-22. Development entitlements shall not be granted in areas where no ground water exists and water purveyors have reached their capacity to deliver treated water unless all necessary agreements and financing to obtain additional water supply are secured.

- CO-23. Subdivisions and Parcel Maps shall be required to demonstrate adequate quantity and quality of groundwater prior to approval of residential lots in areas of the County where supply and quality are doubtful.
- CO-24. Development oriented artificial lakes, unless otherwise required by the County, shall not be approved in areas of ground water overdraft where ground water sources maintain lake level.
- CO-25. Should the Board of Supervisors determine that there is a significant adverse effect on ground water, including effects on quality, no building permits for urban commercial and residential uses shall be issued.

Implementation Measures:

- A. Closely monitor build-out at Rancho Murieta to ensure compliance with policies. (Planning)
- B. Develop a computer tracking program and prepare an annual report on new private and municipal wells within Sacramento County, their depth and nature of aquifer drawn from, and where data are available, their water quality. (Environmental Health)

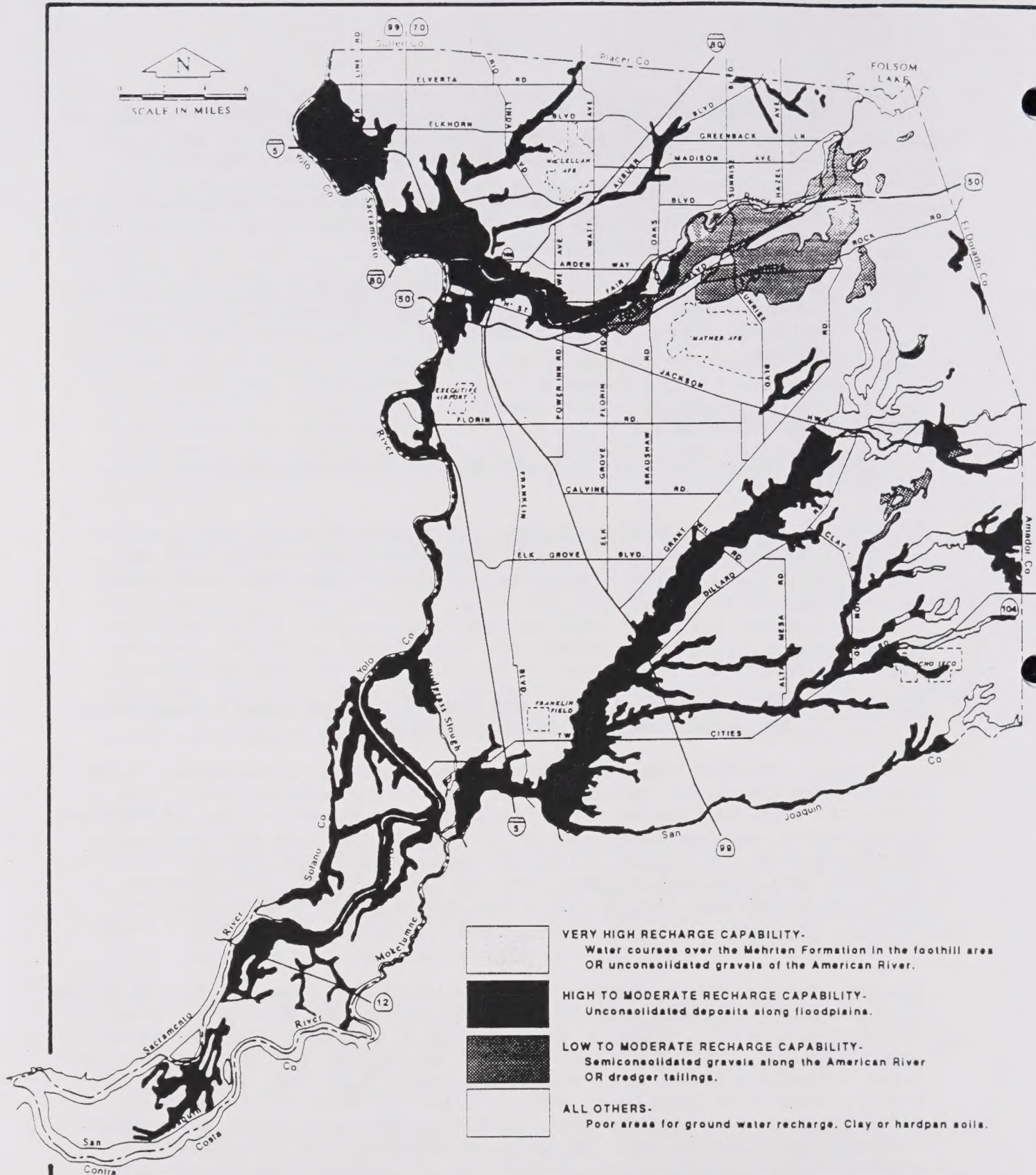
GROUND WATER RECHARGE

Objective: Understanding of nature and extent of ground water recharge with key aquifer recharge areas protected.

Intent: The most significant ground water recharge in Sacramento County occurs along the stream channels of the American and Cosumnes River. The porous soils of the Cosumnes River floodplain, the gravels of the old American River channel, and the black sands of the Mehrten formation where exposed by stream channels also provide additional important recharge (Figure 1). It is important that land uses in these areas not impair ground water recharge. Continued agricultural use of these lands should be the highest priority. However, the intent of Policy CO-28 is not to preclude development in areas zoned urban prior to 1990.

Research and modeling of ground water supply conducted from 1961 to 1970 by the State Department of Water Resources resulted in Bulletin No. 118-3. To date, this remains the only source of research data on Sacramento County's ground water resources. This study involved many assumptions regarding infiltration rates, subsurface flows, and precipitation patterns in order to validate the model. Researchers continue to emphasize that the margin of error in the modelling process is considerable. It is appropriate to seek a more complete understanding of ground water recharge and movement, utilizing improved computer modeling capabilities. Funding for such research should come from water users, although the means of accomplishing this have yet to be worked out.

FIGURE 1



Groundwater Recharge Capability

Prepared by the Sacramento County Planning and Community Development Department

Policies:

- CO-26. Modify the yield estimates of ground water supply as supported by available data and, working in conjunction with area water purveyors, revise conjunctive use and other water supply policies as necessary during five-year General Plan updates.
- CO-27. Maintain agricultural zoning, and existing agricultural uses, in primary aquifer recharge areas identified as having a moderate to very high recharge capability (Figure 1). Rezone applications for categories other than agricultural within one quarter mile of ground water recharge capability boundaries shall supply hydrologic data pertinent to recharge capability before the rezone application shall be considered complete.
- CO-28. Discourage urban land uses in unincorporated areas with moderate to very high ground water recharge capability.
- CO-29. Discourage any nonagricultural land use in unincorporated areas with moderate to very high ground water recharge capability which could allow the percolation of pollutants into the ground water table.
- CO-30. Locate septic systems outside of primary ground water recharge areas, or if that is not possible, require the use of shallow leaching systems for disposal of septic effluent.

Implementation Measures:

- A. Develop study design for program to provide ongoing information on ground water recharge rates and ground water movement utilizing best available technology. (SCWA)
- B. Develop and adopt ordinance establishing funding mechanism. (SCWA)
- C. Implement ground water recharge studies. (SCWA)
- D. Develop procedures for implementing Policy CO-30. (Planning and Environmental Management Department)
- E. Develop procedures to fund ongoing studies of ground water recharge capabilities.

RURAL RESIDENTIAL USES AND GROUND WATER

Objective: Agricultural-Residential land uses regulated to ensure that nitrates entering the ground water from septic disposal systems will not impair ground water quality.

Intent: Ground water currently supplies up to 60% of our water needs, generally offering a high quality, easily accessible supply of water to areas which do not receive surface water supplies. In order to maintain this resource it is important to protect it from contamination by sewage and chemicals. Septic tanks and their leach fields are a significant source of nitrates, therefore, it is important that the concentration and construction of septic disposal systems ensure that contamination of ground water resources will not occur. Factors which provide protection to the ground water supply are size of lot (especially if both a septic system and a water well are to be placed on the same parcel), type of septic system, design and materials used to construct wells, density and spacing of septic systems, and maintenance and monitoring of septic systems. Additionally, small scale agricultural operations where concentrations of manure or fertilizer exist, can impair ground water quality by increasing the level of nitrates in water percolating from ground surface. The policies below provide guidance relating rural residential development with individual septic disposal systems. Further discussion of the basis for 5-acre minimum parcel sizes outside the Urban Service Boundary in agricultural-residential areas is included in the Land Use Element.

The County has conceptually approved formation of a County Service Area (CSA) to provide on-site wastewater management. The CSA will initially provide maintenance services to subdivisions of over 100 lots utilizing septic systems. Among the functions of the CSA will be to take actions to prevent ground water contamination from on-site sewage disposal systems.

Policies:

- CO-31. Notwithstanding any policies elsewhere in this plan, any new parcel created in an Agricultural-Residential area which is less than 5 acres and relies on either an interim or long-term septic disposal system shall be conditioned to redesign or replace septic systems if future testing indicates a trend line increase in nitrate levels.
- CO-32. In the event that ground water quality monitoring indicates a trend line increase in nitrate levels, new or replacement septic systems on preexisting legally established parcels less than 2.5 acres in size shall utilize sewage disposal systems which substantially mitigate the trend line nitrate levels in ground water.

Implementation Measures:

- A. Review and update regulations pertaining to the construction of septic systems and alternative septic disposal methods, including when alternative methods are required. (Environmental Health Division)
- B. Track the number of new and replacement septic systems within agricultural-residential areas, including their design in relation to lot size, and prepare an annual report for the Board of Supervisors. (Environmental Health Division)
- C. Establish a County Service Area to provide septic tank maintenance and develop proposed County Code to address the maintenance service and associated charges. (Environmental Health Division)
- D. Determine the need and means to extend maintenance service to parcels with existing on-site systems and address public education of septic system owners. (Environmental Health Division)

GROUND WATER QUALITY MONITORING

Objective: Comprehensive monitoring of ground water quality throughout the county.

Intent: Sacramento's reliance on ground water resources for domestic consumption makes ongoing comprehensive monitoring of ground water quality essential. The County's current efforts need to be substantially expanded and additional funding provided. The proposed CSA for septic system maintenance is an appropriate authority for levying assessments on residences with private septic systems. There may also be a need to establish a monitoring program which would encompass agricultural areas subject to concentrated applications of fertilizer.

Implementation Measures:

- A. Develop a ground water monitoring program for Zone 40 (Page 112, Water Districts Map). (SCWA and Environmental Health Division)
- B. Develop a county-wide ground water monitoring program, including phasing and financing. (Environmental Health Division)
- C. Implement ground water monitoring program. (Environmental Health Division)
- D. Prepare annual ground water quality report to the Board. (Environmental Health Division)

UNDERGROUND STORAGE TANKS

Objective: Curtailed hazardous material seepage from underground storage tanks.

Intent: A source of ground water contamination includes poorly maintained underground storage tanks storing hazardous materials. Current County regulations, such as the 1983 Right-to-Know ordinance, have reduced contamination from underground tanks containing hazardous materials by requiring that the location of such tanks be registered and routine monitoring performed. However, the 1983 ordinance is focused upon alerting emergency response personnel to potentially dangerous or explosive materials. With over 4,600 underground tanks now registered in the county, most containing gasoline, it is necessary to increase environmental monitoring activities to prevent contamination.

Implementation Measures:

- A. Provide staff support for monitoring tank testing programs and responding to contamination site cleanup. (Environmental Management Department)
- B. Operate under the agreed upon work authority for prosecuting crimes involving hazardous materials as defined by the Memorandum of Understanding between the County's Environmental Management Department and the State Department of Health Services. (Environmental Management Department)
- C. Develop procedures to inform business and the public about potential financial and criminal liability if routine or accidental release of undisclosed toxic chemicals should harm emergency personnel, employees, or the public. (Environmental Management Department)

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION I

WATER RESOURCES

D. WATER CONSERVATION

GOALS: Water resources utilized with maximum feasible conservation and reuse.

INTRODUCTION

Water supplies in California are dictated by climatic conditions. Because of the often severe limitations placed on water supplies by the arid climate, water conservation - more efficient use of water in all its applications - has been instigated by many water agencies to reduce the rate of water depletion. Conservation stretches the supply of water available for domestic, industrial, and, agricultural uses and increases the supply available for in-stream uses.

The Central Valley, a semiarid climate prone to periodic droughts, has had several opportunities to learn the need for and worth of conservation programs. Recent droughts have increased the public awareness and support for conservation measures. Certain conservation programs, implemented in response to water shortages, have gained public support, and have remained in place after the immediate crisis has passed. However, other aspects of conservation, specifically metering, have met with much resistance. Metering can improve conservation by monitoring rate of water use and manipulating price structures. Yet, before metering can be considered politically palatable, equity issues and political considerations regarding Sacramento's ability to compete for new surface water rights require resolution. Other less controversial conservation measures include voluntary conservation programs, water reuse, and implementation of xeriscaping (water conserving landscaping) ordinances.

Much of the water used in the Sacramento Area is withdrawn from the American River and eventually returns to the Sacramento River as runoff or treated discharge from the Regional Sanitation Plant. Areawide water conservation measures would benefit biological and recreational values in both the American and Sacramento Rivers by reducing water withdrawal amounts and maintaining natural discharge flows through the Delta.

Along with water conservation, recycling water is another way to stretch existing water supplies. Treated water can be used for landscaping and agricultural irrigation, where the high levels of dissolved nutrients fertilize landscape plantings and crops. In addition industry can recycle its own waste water with only minor modifications to their present systems. However, to eliminate risks to human health and the environment, treated sewage or waste

must be constantly monitored for hazardous contaminants such as viruses, bacteria, heavy metals or carcinogenic substances.

Water conservation and reuse issues are addressed by the policies and programs under the following objectives:

1. Reduction of total water consumption by specified amounts by the year 2010.
2. Water metering in unincorporated areas by 2010.
3. Reuse of water wherever possible.
4. Xeriscaping for public and private landscaping.
5. Conservation values awareness.

WATER CONSERVATION PLANS

Objective: Full implementation of all cost-effective water conservation measures by 2010.

Intent: Despite progress in water conservation, Sacramento needs to do more than rely on an informal, voluntary conservation program which is supplemented by emergency measures in dry years. Long-term reduction in per capita consumption will become increasingly important as water demand grows. Conservation maximizes efficient use of water while reducing diversions which would detract from in-stream flow values. Whether appropriate or not, the Sacramento Area has an image as a profligate water consumer. An institutionalized formal conservation program such as the one proposed in the Memorandum of Understanding Regarding Urban Water Conservation in California will help dispel that notion and improve the County's position in California water politics.

The intent of the above objective is to foster the development of conservation plans by the County as well as by individual water purveyors. Although the County has limited authority to compel conservation plans and will need to rely on cooperative efforts of water purveyors, the USBR will provide incentive with an expected conservation planning requirement as a condition on any future surface water contracts. The Sacramento County Water Agency can be effective by assisting each purveyor in developing its own individual conservation plans and in developing baseline data and guidelines for the conservation programs. Consumption data gathered by Boyle Engineers for the County in a recent study make 1988 an appropriate base year.

Policies:

CO-33. Implement the "Memorandum of Understanding Regarding Urban Water Conservation in California" in those areas where the County provides water service. Encourage all urban water purveyors in Sacramento County to execute and implement the MOU.

CO-34. Encourage all irrigation district and major agricultural water consumers in Sacramento County to assist in completion of, be signatory to, and implement an MOU establishing Efficient Water Management Practices for Water Suppliers.

CO-35. Work with urban and agricultural water purveyors in Sacramento County to establish their own long range conservation plans which set specific conservation objectives and utilize, to the extent possible, a common planning horizon, plan framework and estimating/forecasting procedures.

Implementation Measures:

- A. Develop baseline consumption data and guidelines for preparing long range conservation plans. (SCWA, COWMP, and Planning, working with water purveyors)
- B. Prepare a long range conservation plan for those areas where the County provides water service. (SCWA)
- C. Prepare an annual report on progress towards implementing Best Management Practices established in the MOU Regarding Urban Water Conservation in California (SCWA).

WATER METERING

Objective: One hundred percent water metering in the unincorporated area by the year 2010.

Intent: As of January 1, 1992, state legislation required water meters on all new development connected to a water purveyor. Metering all new and existing connections will be an effective method of monitoring water consumption and reducing water use.

Water metering programs need not apply to structures receiving water from individual on-site wells because water use can be gauged by pumping costs and because practical reading, rate-setting or billing options are unavailable to foster conservation practices for such properties.

Water meter programs pertain only to areas designated as urban and which are connected to a district water supply or receive water from a private water purveyor. They should not apply to areas not connected to a public water agency or private water company distribution system. This would exclude most Agricultural-Residential and agricultural areas.

Policies:

CO-36. The SCWA is directed to investigate the feasibility and funding of a retrofit water meter program.

CONSERVATION AND WATER REUSE IN PROJECT DESIGN

Objective: Water efficient landscape and design that utilizes water conservation methods and water reuse technology whenever possible.

Intent: This objective includes 3 different parts. The first part, xeriscaping, or water efficient landscaping, is an idea that is gaining increasing favor in California and other arid regions of the United States. This type of landscaping has advantages because of its low water demand. Often the plants and materials used are native to the area, require a minimum of maintenance, and the plants are often much more hardy than traditional landscape species. There is currently an effort to make xeriscaping policies mandatory statewide. Many jurisdictions have already passed their own xeriscaping ordinances, including Sacramento County.

The second part of the objective involves reuse of water and conservation wherever possible on a project-by-project basis. County policy would require consideration of water reuse for individual projects as it might relate to proposed ponds, fountains, landscaping, commercial/industrial applications, or new technological devices which assist in reducing individual and collective water consumption. Such new devices include moisture sensitive home irrigation systems and plumbing fixtures which function with reduced water volume.

The third part of the objective involves using treated wastewater from the regional treatment plant for crop irrigation, landscape irrigation, wetlands augmentation or other appropriate uses.

Policies:

- CO-37. Projects involving public or private lakes and ponds and/or landscaped public areas shall be designed to emphasize native vegetation so as to minimize net water consumption.
- CO-38. All development projects, excluding single-family homes, shall incorporate water-efficient landscaping.
- CO-39. Development project approvals shall include a finding that all feasible and cost effective options for conservation and water reuse are incorporated into project design. Wastewater reuse options shall be reviewed and agreed upon by the area water purveyor when the reclaimed water is to be used within the water purveyor's boundaries.

Implementation Measure:

- A. Determine increment of reclaimed water legally available from the Region Treatment Plant in terms of the time and quantity. (Regional Sanitation)

- B. Determine need and suitability of treated water for agriculture, landscape and golf course irrigation, supplemental flows for wetlands and ground water recharge within the vicinity of the plant. (Regional Sanitation)
- C. Conduct economic feasibility studies and develop plan to achieve wastewater reuse objectives. (Regional Sanitation)
- D. Identify potential water conservation and reuse methods and technologies that are appropriate for the semiarid conditions of Sacramento County. (Regional Sanitation)

WATER CONSERVATION VALUES

Objective: Understanding and respect for importance of water.

Intent: If water conservation is to be successful in Sacramento County, the public will need to be aware of the importance of and reasons for conserving water. The best water metering and pricing programs, xeriscaping ordinances, ground water overdraft protection policies, and waste water reuse programs will only be partially successful if the people who use the water don't understand and believe that there are legitimate reasons for them to make every effort to conserve water. The County should support public information programs which explain water resource conservation policies and the importance of their contribution to the conservation effort. These programs should make good use of media, schools, and individual water purveyors in order to communicate the message to as many people as possible on a continuing basis. These messages should be aimed at all types of users, municipal, agricultural, and industrial/commercial.

Policy:

- CO-40. Work with the Sacramento Area Water Works Association (SAWWA) in a County-wide effort to inform the public of the critical importance of water in Sacramento's urban environment, and to actively engage water customers in an ongoing effort to conserve water.

Implementation Measures:

- A. Develop an information program which explains where Sacramento's water comes from and what the limits on water resources are.
- B. Develop an information program and public service announcements encouraging ongoing conservation practices by water users.
- C. Develop information programs with conservation districts to communicate irrigation conservation strategies to professional and hobby farmers.

(SCWA and Planning, in coordination with water purveyors and conservation districts)

- D. Provide County funding for SAWWA's conservation education efforts and request SAWWA's cooperation in incorporating the County's objectives into the SAWWA water conservation program.
- E. Develop an awards program which annually recognizes outstanding individual, corporate, and agency achievements in implementing water conservation programs in Sacramento County. (Board of Supervisors, COWMP, and SAWWA)

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION II

MINERAL RESOURCES

GOAL: Mineral resource protected for economic extraction with minimal adverse impacts.

INTRODUCTION

Mineral resources in Sacramento County include natural gas, petroleum, sand, gravel, clay, gold, silver, peat, topsoil and lignite. The principal resources which are in production are aggregate (sand and gravel) and natural gas. The natural gas production areas are located mostly in the Delta's Rio Vista Field, one of California's largest producing areas. There are three major and several smaller producers of sand and gravel in Sacramento County, the larger producers are located in the Fair Oaks and Perkins-Kiefer areas. They also produce asphaltic and Portland concrete along with free gold and silver recovered from the crushing process. Clay is surface mined in at least two locations; topsoil from one location on the Cosumnes River. At present, peat and lignite deposits in the Delta are not commercially mined. Resource conservation issues associated with natural gas production and the lesser minerals are not significant. This plan focuses primarily on aggregate production.

All of the sand and gravel mined in Sacramento County is used for construction. Construction aggregates are an important, fundamental building material extensively used as a foundation and road base material, and with a Portland cement or asphaltic binder, in all types of road pavement and construction concrete. In terms of volume and price, there is presently no economic substitute for aggregate products.

The demand for aggregate products in the Sacramento region has increased with the region's population and corresponding physical growth. The 1986 Aggregate Resources Report estimated that approximately 150 million tons of aggregates will be consumed between 1985 and 2000, and that total identified resources would be depleted by 2009. Annual consumption now approaches 13 million tons. Based on more current data, known resources will be mined by 2004. Thus, within the timeframe of this plan, the aggregates industry will either need to locate and mine new resource areas or begin importing, at much higher cost, from more distant areas. Recycling concrete and asphalt from demolition projects for base and fill can also help meet some demand (and help reduce the volume of landfill).

Sacramento County's primary remaining aggregate deposits are located in the Old American River channel south of Rancho Cordova (see Figure 1 in Background

Report). To date, the County has been exemplary in designating and protecting these areas for future mining, aided greatly by land use restrictions associated with aircraft noise from nearby Mather Air Force Base. However, the eastward progression of urban development, coupled with major changes at Mather, present important land use questions for aggregate resource lands. The General Plan recognizes the conflict and tries to accommodate both resource protection and urban growth. Policies address the need to carefully coordinate urban development and mining to minimize the inherent conflicts.

The need to conduct surface mining so as to minimize adverse environmental effects and ensure reclamation for future use is recognized by both state and County regulations. The Zoning Code requires surface mining combining zoning; a conditional use permit addressing potential noise, dust, water quality, traffic and aesthetic problems; and a reclamation plan for future use of mined areas prior to initiating any mining. The General Plan must provide support and direction for administering these regulations.

This section describes policies and programs under five objectives:

1. Known resources protected for future mining.
2. New resources located.
3. Orderly resource extraction with minimal adverse impacts.
4. Sequential timing of mining and urban development.
5. Concrete recycled.

MINERAL RESOURCES PROTECTED

Objective: Known mineral resources protected from land uses which would preclude or inhibit timely mineral extraction to meet market demand.

Intent: The General Plan land use diagram identifies primary aggregate resources of the American River channel deposit with an aggregate resources combining land use category. The first policy formalizes existing practice with respect to applying the combining land use category and Surface Mining Combining (SM) zone. The second policy calls to attention the need to plan sewer system extension carefully so as not to preclude mining or future reclamation options.

Policies:

CO-41. Apply the aggregate resources combining land use category to additional areas as subsequent studies determine them to contain mineral resources which are feasible and appropriate for mining. The aggregate resources combining land use category shall not be a prerequisite to (SM) surface mining combining zoning in conjunction with proposed surface mining.

- CO-42. Sewer interceptor and trunk alignments shall be routed to avoid areas planned for aggregate resource mining to the extent practical. Where such alignments are impractical, they shall be designed to minimize aggregate resources which would be precluded from mining, and make reasonable attempt to preserve the future use of mined areas for flood control or recharge purposes.

MINERAL RESOURCE EVALUATION AND MANAGEMENT

Objective: Resources and options for future extraction identified within the context of an ongoing local resource evaluation and management program.

Intent: The State Division of Mines and Geology has the primary responsibility under the provisions of the Surface Mining and Reclamation Act of identifying aggregate resource areas. Previous studies have focused on the American River channel deposit in North Sacramento County. They provided broad estimates of the extent and quality of deposits without extensive sampling. Funding and priorities will not enable additional resource study in Sacramento for the foreseeable future. Relying solely on local aggregate producers to identify resources will yield privately initiated and perhaps scattered rezones and use permit proposals, which would not allow the comprehensive planning perspective of a broad study followed by General Plan changes. Additional revenues are needed to fund a County resource evaluation effort and provide trained staff to deal with the full range of aggregate resource issues. The County should investigate establishing a resource extraction fee on the order of two cents per ton of estimated extractable deposits which might be payable in annual installments over the term of use permits.

Implementation Measures:

- A. Determine the extent and quality of aggregate resources in Sector I-3, on Aerojet property, the Cosumnes River above Wilton Road and other locations with potential mineral resources. (Planning)
- B. Study the feasibility of establishing, in conjunction with use permit approval for surface mining, a resource extraction fee to fund a staff geologist and consultant services as necessary to implement policies and programs relating to mineral resource protection. (Planning)
- C. Establish regular coordination with the State Division of Mines and Geology, provide them with information regarding aggregate resource depletion in the County, and solicit financial and technical assistance for resource studies. (Planning)

EXTRACTION OF MINERALS

Objective: Orderly extraction of minerals and subsequent reclamation of mined areas with minimal adverse impacts on aquifers, streams, scenic values, and surrounding residential uses.

Intent: This objective is largely implemented through existing County Zoning Code provisions and CEQA. Policies below provide support. Cyanide leaching of gold does not currently occur in Sacramento and the prohibitive policies reflect its inappropriateness in an urban county. Sector I-3 between Elder Creek and Florin Roads east of the power line corridor is adjacent to a planned high density urban corridor and should be reclaimed in such a way as to facilitate future residential use.

Policies:

- CO-43. Surface mining operations shall not, after mitigation measures are accounted for, create any significant nuisances, hazards, or adverse environmental impacts.
- CO-44. Surface mining shall maintain substantial minimum setbacks from adjoining rural residential land uses.
- CO-45. Surface mining shall not be allowed without adequate plans for reclamation of mined areas.
- CO-46. Reclamation plans associated with use permits for mining in Sector I-3 shall be based on a comprehensive reclamation plan for moderate density residential use.
- CO-47. Gold extraction utilizing cyanide leaching systems shall not be permitted.

Implementation Measures:

- A. Require a conditional use permit for surface mining operations and periodically monitor implementation of conditions. Ongoing. (Planning)
- B. Maintain and update information pertaining to appropriate state-of-the-art techniques for erosion control, reclamation, nuisance prevention and environmental impact mitigation relative to surface mining operations. Ongoing. (Planning)
- C. Provide pertinent applications, plans and environmental documents to all agencies which may be involved with future reclamation uses, including service providers, parks agencies, and resource management agencies. Ongoing. (Planning)

NEW URBAN DEVELOPMENT AND SURFACE MINING

Objective: Sequential timing for mining of aggregate areas linked to the timing of urban development.

Intent: Aggregate mining is an interim use of land. Mined and reclaimed sites can be reused for agriculture or open space uses either permanently or as additional interim uses until such time as final reuse plans are adopted. The Draft General Plan designates the Vineyard community area south of Elder Creek Road as a future urban growth area. Sector I-3 between Elder Creek Road and Florin Road is adjacent to a planned high density transit-oriented node with high priority for development (Figure 2). The state estimates the 340 acre sector to contain 12.3 million tons of aggregates, although additional testing is necessary. Since it will be very difficult to initiate surface mining once adjacent urban development occurs, mining this area should be a high priority.

Policy:

CO-48. Sector I-3 south of Elder Creek Road shall be a high priority area for mining to allow for its future urban use.

Implementation Measures:

- A. Develop a strategy for mining Sector I-3 in conjunction with timing of adjacent urban development. (Planning)
- B. Develop a strategy for mining Mather AFB lands in conjunction with reuse needs for the Base. (Planning)

AGGREGATES RECYCLING

Objective: Ten percent and twenty percent of demand for aggregates met by recycled or substitute materials by 2000 and 2010 respectively.

Intent: Local aggregate producers primarily harvest PCC grade aggregate--the highest quality and the most easily processed in terms of production costs. Good quality aggregate is being rapidly depleted. Yet, it is still processed into asphalt blends, road base and fill material.

The Los Angeles area recycles between 8 to 10 million tons of concrete and asphalt per year, yet no private firms in Sacramento currently recycle concrete and asphalt from demolition debris. Local government does not require the separation and recycling of these materials. A requirement that new road base material be partly comprised of recycled material could help initiate a market in this area. However, safeguards are essential to ensure that material recovery and processing is conducted without adverse impacts.

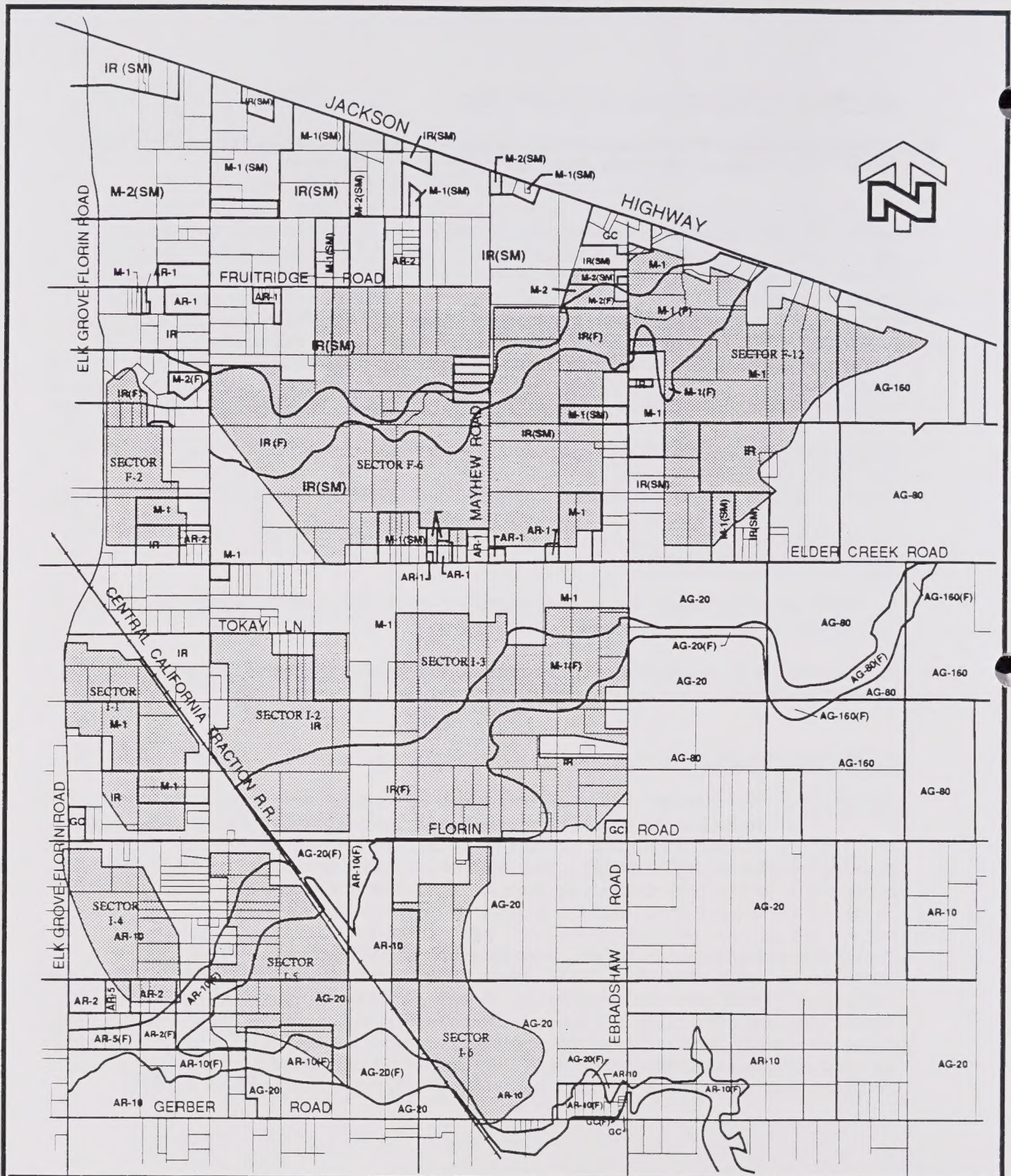


Figure 2

MRZ-2 Sectors

SOURCE: DMG-SR156

Prepared by the Sacramento County Planning and Community Development Department

Policy:

CO-49. To the maximum extent possible, all base material utilized in County and private road construction shall be composed of recycled concrete.

Implementation Measures:

- A. Modify construction standards for County roads. (Public Works)
- B. Develop appropriate conditions applicable to projects involving private roads. (Planning)
- C. Investigate the use of recycled concrete or substitute materials in other construction applications. (Planning and Public Works)
- D. Investigate concrete recycling operations elsewhere and determine appropriate mitigation measures. (Planning)

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION III

MATERIALS REUSE

GOAL: Widespread use, reuse and recycling of materials by county residents and businesses leading to significant per capita waste reduction.

INTRODUCTION

Significant changes in public attitudes and new government mandates to reduce solid waste are the recent result of widespread public recognition of ever-growing solid waste generation, lack of suitable disposal sites, toxic contamination at many landfills, and the harmful environmental side effects of disposable packaging. Clearly, the more we successfully reuse and recycle materials, the more we will conserve virgin natural resources, reduce garbage in the environment and extend landfill lives.

Unincorporated Sacramento County daily generates approximately seven pounds per capita of solid waste or more than 865,000 annual tons. Although the County does have adequate landfill capacity, there is considerable opportunity and benefit to be gained in materials reuse and significant local motivation in state mandates to achieve 25 percent and 50 percent reduction in solid waste landfill volume by 1995 and 2000 respectively. This section discusses a policy framework to not only achieve waste reduction, but ultimately to integrate materials reuse into the everyday activities of county residents, businesses, and government agencies.

A number of issues face Sacramento County as it initiates this effort, including source-separated, curbside collection versus commingled collection with centralized separation, development of effective educational and promotion programs, and the possibility that recycling efforts will far outpace the market for materials reuse. These and other issues will be addressed in the Source Reduction and Recycling Element, the Facilities Siting Element, and the Integrated Waste Management Plan (required in 1991 and 1993). These documents will provide the comprehensive policy base to begin achieving the following objectives:

1. A 50 percent diversion of the waste stream from the landfill by 2000 through source reduction, recycling, and composting.
2. Increased participation rate for residents and businesses in a Countywide recycling program by 2005.

3. A sustainable market for all recycled materials supported by procurement of recycled or reusable products and materials purchased by the County.

Additional policies related to solid waste disposal are located in the Public Facilities Element, Solid Waste Section.

SOLID WASTE REDUCTION PLAN

Objective: A 50 percent diversion of the waste stream from the landfill by 2000 through source reduction, recycling, and composting.

Intent: The 50 percent reduction in the total solid waste stream is mandated by state law. Analysis prepared for the Solid Waste Division of Public Works indicates that the source reduction, recycling and composting programs below will achieve the 50 percent waste diversion if fully implemented.

Implementation Measure:

- A. Adopt a County Source Reduction and Recycling Element required under Assembly Bill 939 which includes policies and programs for curbside recycling programs, recycling programs serving multi-family households, central commercial and residential waste processing facilities, composting of vegetable waste generated in the unincorporated area, and ongoing monitoring and assessment of waste-to-energy technology potential in Sacramento. FY 1990-91. (Solid Waste)

RESIDENTIAL PARTICIPATION IN RECYCLING

Objective: Increased participation rate for residents and businesses in Countywide recycling programs.

Intent: The City and County of Sacramento are both implementing three-bin curbside recycling programs which depend upon residents to voluntarily separate recyclable materials before collection, an effort and commitment which is beyond the experience of most residents. Public education and promotional programs are designed to increase the public's awareness of the need to recycle and to demonstrate how easy it is to participate. Financial incentives to recycle should be considered to achieve this objective. Additional policies related to material waste are located in the Public Facilities Element, Solid Waste section.

Policies:

- CO-50. Commit adequate funds from collection fees to advertise and promote public participation.

Implementation Measures:

- A. Identify and evaluate the feasibility of potential financial incentives, including differential rates. Develop implementation steps and timetables for the recommended measures. (Solid Waste)
- B. Identify and evaluate building design requirements which would facilitate recycling. (Building Inspection and Solid Waste)
- C. Develop measures requiring specified commercial and industrial developments to prepare recycling implementation plans. (Planning and Solid Waste)

RECYCLING MARKET

Objective: A sustainable market for all recycled materials supported by procurement of recycled or reusable products and materials purchased by the County.

Intent: Successful recycling programs depend on a market for reusable materials sufficient to accommodate the volume of recyclable products collected. New state mandates for recycling risk flooding the market with more materials than industries can reprocess, potentially leading to their disposal in landfills. State legislation and programs to stimulate the market for recycled materials are essential. For its part, local government must describe in its Source Reductions and Recycling element methods which will be used to increase markets for recycled materials. A County procurement program prioritizing the purchase of recyclable materials and recycled products will be an important part of this plan. An aggressive procurement policy may be able to achieve an objective that at least 50 percent of the County's purchases be comprised of recycled or reusable products.

The Department of General Services has prepared a work plan for developing a recycled purchases program which encompasses the implementation measures of this element. With the information gained from this effort, it will be appropriate to incorporate into the Conservation Element a specific percentage objective for the purchase of recycled, recyclable or reusable products and additional implementing policies to assist in meeting the objective.

Policies:

- CO-51. All County departments and agencies shall establish procurement policies and procedures which facilitate purchase of recycled, recyclable or reusable products and materials where feasible. Specifications shall not require virgin materials or exclude recycled products, reusable or recyclable products unless the department can demonstrate to the satisfaction of the County Executive that such products would not achieve necessary performance standards.

- CO-52. Outside contractors bidding to provide products or services to the County, including printing services, must demonstrate that they will comply with County recycled materials policies to the greatest extent feasible.
- CO-53. Actively promote a comprehensive, consistent and effective recycled materials procurement effort among other governmental agencies and local businesses.

Implementation Measures: (All General Services)

- A. Identify to the maximum extent feasible those products and materials which are made or which are partially made, from recycled materials. Identify products and materials which the County purchases which, if substituted with a recyclable or reusable product or material, would reduce the waste stream.
- B. Review existing department procurement policies to ensure they do not include the use of such products.
- C. Evaluate and recommend specific policies or programs to promote recycled product purchases, including commitments to purchase selected products only as recycled, establishment of "set asides" of total purchases, cooperative purchasing programs, and price preferences.
- D. Revise departmental procurement policies and procedures to ensure that performance standards for particular products can be met and that specifications are not overly stringent and that they incorporate reusable products and products designed to be recycled.
- E. Develop a monitoring program to assess progress towards reaching recycled products procurement objectives.

SACRAMENTO COUNTY GENERAL
PLAN CONSERVATION ELEMENT

SECTION IV

SOIL RESOURCES

GOAL: Preserve and protect long-term health and resource value of agricultural soils.

INTRODUCTION

Sacramento County's agricultural economy is, and will remain, dependent upon soil productivity. Productive soils are generally found in three different geomorphic regions: the ancient river terraces, the geologically recent river flood plains, and the Delta. The river terraces, or bench soils, have reduced organic material in the soil matrix, but are agriculturally productive. The flood basin soils are alluvium materials, with an increased percentage of organic and mineral compounds. Lastly, the Delta soils are primarily fertile peat comprised of slow-to-decay organic material.

Much of the agriculturally productive soil has been defined by the U.S. Soil Conservation Service as prime (nationally important), statewide in importance, unique, locally important, or grazing. These definitions recognize the lands suitability for agriculture and reflect not only the physical and chemical characteristics, but soil quality, appropriate growing season, and adequate moisture supply. Approximately half of the productive farmland in Sacramento County is classed as prime; farmlands statewide in importance, unique farmland, farmland of local importance, and grazing land comprise the remaining balance.

To continue viable agricultural production the County's productive soils need to be preserved and maintained. To this end, farm community members have entered into agreements with the Soil Conservation Service to create three Resource Conservation Districts in the southern portion of the County -- Florin, Lower Cosumnes, and Sloughhouse. The Soil Conservation Service provides technical and financial assistance to members of these districts.

Much of the Delta peat soils in the Lower Cosumnes Resource Conservation District are undergoing subsidence from oxidation (exposing peat to the drying factors of air) and subsequent shrinkage and wind erosion. Tillage and irrigation on islands experiencing high amounts of subsidence should be curtailed to slow the rate of soil loss and protect sinking levees and adjacent islands.

Urban expansion in much of the County has converted productive agricultural land into other uses. During the 1980s total acreage in production fell from nearly 375,000 acres to below 253,000 acres. Over the same decade, of the

630,400 acres comprising the County, 59.5 percent were in production in 1980. At the close of the decade the figure had dropped to 40 percent. Lost acreage from conversion to urban uses is permanently withdrawing productive soils from agricultural production. Consideration of the inherent value of agricultural land should be closely examined when deciding to develop or not develop on fertile soils.

This section describes policies and programs under five objectives:

1. Loss of important agricultural soils compensated for by long-term protection of land with similar productivity value.
2. Agriculturally productive Delta soils protected from the effects of oxidation, shrinkage, and erosion.
3. Appropriate soil conservation practices regularly utilized by farmers and ranchers.
4. Widespread farmer participation in Resource Conservation District programs.
5. Mining of top soil to have minimal effect on soil productivity.

Review and analysis of soil productivity is in the Background Reports volume of the General Plan

DEVELOPMENT AND AGRICULTURAL SOILS

Objective: Loss of important agricultural soils compensated for by long-term protection of land with similar productivity value.

Intent: In recent years productive cropland has been increasingly converted to urban uses. In the 1980s over 122,000 acres of farmland were converted to nonagricultural uses, and the proportion of agricultural acreage compared to nonagricultural acreage dropped almost 20 percent. As conversion of productive farmland continues, it permanently commits agricultural land to a nonproductive category, from the agricultural perspective. To curb this decline and protect soil productivity, policies to preserve agriculturally productive lands within the County need to be instigated. Due to the pressures of population growth, development, and economic expansion, maintaining the current inventory of farmland is not feasible. However, mitigation of farmland loss, whenever possible, is justified when development sets in motion processes which lead to additional conversion of nearby lands.

Policy CO-55 proposes the threshold concept by defining the loss of 50 acres or more of prime or statewide in importance soils to be a significant environmental effect, per CEQA. An additional policy requiring mitigation of farmland, particularly prime farmland or land with intensive agricultural uses, is located in the Agricultural Element.

Policies:

- CO-54. Direct development away from prime or statewide importance soils or otherwise provide for mitigation that slows the loss of additional farmland conversion to other uses.
- CO-55. Projects resulting in the conversion of more than fifty (50) acres of prime or statewide in importance farmland shall be deemed to have a significant environmental effect, as defined by CEQA.
- CO-56. Golf courses shall not be constructed on prime farmlands outside of the urban service area boundary.

Implementation Measures:

- A. Designate areas comprised of soils classed as prime to mitigate loss of agriculturally productive acreage. (Planning)
- B. Designate agriculturally productive soils on Community Plan maps. (Planning)

OXIDATION OF DELTA SOILS

Objective: Agriculturally productive Delta soils protected from the effects of oxidation, shrinkage, and erosion.

Intent: Cultivation on prime Delta farmland soils produces a high yield of crop commodities. However, crop production has also encouraged subsidence of the agricultural land and surrounding levees threatening production on some Delta islands. The peat soils of the Delta, comprised of slow-to-decay organic material continually submerged, can shrink in volume by as much as 50 percent when exposed to the drying factors associated with air. This process, called oxidation is the primary contributing factor to subsidence of Delta crop lands and has the potential, to significantly alter agricultural production, economically the areas most important activity. In addition, Delta soils have been identified as highly erodible by the U.S. Soil Conservation Service. Cultivation of such land owned by farmers receiving crop subsidies from the federal government are supposed to be regulated under provisions of the 1985 Farm Bill. However, current regulatory procedures only require documentation of agricultural management practices and have not had a significant effect in reducing oxidation of Delta soils.

To retard peat oxidation minimal tillage, the practice of reducing repetitive cultivation, should be instigated to lessen soil loss from erosion and shrinkage. In addition, consideration should be given to significantly curtailing cultivation on islands adjacent to Suisun Bay to preserve their effectiveness as a buffer between up-Delta islands and the erosional forces of Bay tidal action.

Policies:

CO-57. Curtail tillage of peat-rich Delta soils to retard erosion and subsidence, and protect the agricultural productivity of Delta islands.

Implementation Measures:

- A. In conjunction with the U.S. Geological Survey (USGS) and the State of California's Department of Water Resources (DWR) continue monitoring subsidence in zones of organic material. (Planning and associated state and federal agencies)
- B. Report to the Board of Supervisors on research tracking the rate and amount of subsidence as part of the annual crop report. (Agricultural Commissioner)
- C. In conjunction with Soil Conservation Service and the associated Lower Cosumnes Resource District, present workshops or other similar public format programs to Delta residents regarding soil and water conservation measures appropriate to maintaining the area's agricultural viability. (Agricultural Commissioner and associated federal agency)
- D. Develop minimal tillage management practices. (Planning)

SOIL CONSERVATION PRACTICES

Objective: Appropriate soil conservation practices regularly utilized by farmers and ranchers.

Intent: Farm practices which encourage conservation and preservation of productive soils is the primary responsibility of the U.S. Soil Conservation Service (SCS). The goal of the SCS, through research, technical assistance, financial aid, and public workshops, is to instill in agricultural land owners knowledge of sound soil management practices. The role of the County in this effort is limited. However, by working together with the SCS towards their goal to preserve and protect soils throughout the area, the County can identify soil conservation as a priority when setting policy. To this end the County should work with the SCS to promote wise and conservative use of productive soils.

Implementation Measures:

- A. Institute soil and water conservation measures on County lands, including but not limited to, erosion control devices, grazing schedule, seasonal planting of nitrogen fixing plants, and reintroduction of native bunch grasses. (Parks and Regional Sanitation District)
- B. In consultation with Soil Conservation Service staff, design interpretive display at an appropriate park site in the southern section of the County demonstrating sound soil conservation management practices. (Parks and associated federal agency)

RESOURCE CONSERVATION DISTRICT PROGRAM

Objective: Widespread farmer participation in Resource Conservation District programs.

Intent: Membership and participation in the Resource Conservation District program provides area farmers and other landowners with readily available expertise in land stewardship including methodologies to curtail soil loss from wind and water erosion. Expansion of current districts and creation of new districts, especially in the northwestern section of the County, increases the level of participation and heightens the awareness of both commercial agriculturalist and hobby farmers. Although the role of the County is limited it should, whenever possible, assist the SCS in expanding their sphere of influence.

Policies:

CO-58. Work with rural landowners and existing Resource Conservation Districts to promote soil conservation practices.

Implementation Measures:

- A. Request that the U.S. Soil Conservation Service expand Florin Resource Conservation District to include agricultural/residential zoned areas north of current boundaries. (Agricultural Commissioner)
- B. Assist in preparing document to seek LAFCO's approval for a Resource Conservation District in Natomas area. (Agricultural Commissioner)

TOPSOIL MINING

Objective: Mining of top soil to have minimal effect on soil productivity.

Intent: Top soil mining of productive soils in flood plain areas has little effect on soil productivity, provided that extraction methods do not remove more than the top 12 inches of soil. Flood plain soils, where such mining typically occurs, are generally 10 feet or more in thickness. However, the most productive layer of soil, based on organic content, is found within the top two feet of the soil profile. Mining of soils deeper than one foot decreases crop productivity by removing a major portion of the soil layer considered most productive. Although top soil mining has little effect on soil productivity, environmentally unsound surface mining and reclamation methods can be detrimental to topographic definition and hydrologic processes. See Surface Mining document for policies regarding resource extraction methodologies.

Policy:

CO-59. In areas where top soil mining is permitted, it shall be done so as to maintain the long-term productivity of the soil.

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION V

VEGETATION AND WILDLIFE

A. MARSH AND RIPARIAN AREAS

GOAL: Healthy, well-managed marsh and riparian woodlands along Sacramento County's waterways.

INTRODUCTION

Since the time of European settlement both marsh and riparian areas of Sacramento County have been reduced significantly. Approximately 95 percent of the Central Valley's marshlands have been lost in the past 100 years, reducing habitat for the millions of migrating waterfowl traveling the Central Valley leg of the Pacific Flyway. Riparian habitat has suffered a similar fate. In the Sacramento River Valley only 25,000 of the estimated 500,000 acres of riparian habitat existing in 1850 remain today.

The County of Sacramento is fortunate to have several locations where vestiges of this once vast wetland habitat still exist. Remaining marsh and riparian areas in the County include historic backwater basins along the Sacramento River, the American River Parkway, and the nationally significant valley oak riparian forest along the lower Cosumnes River. The Beach/Stone lakes area, a designated National Wildlife Refuge, hosts thousands of waterfowl migrating along the Central Valley leg of the Pacific Flyway. The area is a dynamic and vigorous habitat supporting, among other species, American white pelican, great blue heron, northern harrier, coyote, grey fox, beaver, and possibly bobcat. The Audubon Society and the U.S. Fish and Wildlife Service have designated the area critical and are seeking measures to protect this thriving and diverse habitat. The County's American River Parkway, bisecting the urban environs, has protected a vibrant riparian forest stretching 30 miles along the lower American River. The undammed Cosumnes, exemplary of what was once expansive woodlands, represents a comparatively unaltered Central Valley ecosystem with slough, marsh, and riparian habitats, each slightly different in its ecological balance. Other significant marsh and riparian areas exist along Delta sloughs and seasonal creeks flowing into the major drainages.

The diversity of marsh and riparian woodlands and their importance to the ecosystem make their preservation an important national and state priority, yielding not only increased attention to resource protection, but a coordinated effort to create new wetland and riparian areas. Policies of this section lend local initiative and support to these efforts. The Open Space Element describes additional protection measures.

This section describes policies and programs under three objectives:

1. Marsh and riparian habitat protected.
2. Ten percent increase in marsh and riparian woodland habitat by 2010.
3. Riverbanks stabilized to protect levees and riparian values.

HABITAT PROTECTION

Objective: Marsh and riparian habitat protected.

Intent: Marsh and riparian areas are an integral and vital element of the County's natural landscape. Such areas serve as permanent or seasonal home to a plethora of wildlife species, several of which are listed as threatened or endangered. Furthermore, such areas preserve open space, enhance passive recreational opportunities, and provide flood control.

Under current Federal regulations marsh and riparian areas are protected to a limited extent by provisions of the Food Securities Act generally referred to as the Farm Bill of 1985 and the Clean Water Act. The Farm Bill contains provisions to protect marsh and riparian areas on agricultural crop lands. However, only farm owners receiving crop subsidies from the federal government are regulated by what has become commonly known as the swamp buster provision. The Clean Water Act, through Section 404, regulates the filling of wetlands except as associated with normal farming practices. The following policies support these laws and extend similar protection to riparian habitat. They limit but do not preclude farming activities. The policies do not seek to saddle landowners with an unreasonable burden, but attempt, when possible, to protect marsh and riparian areas vital to migrating waterfowl or important for biologic diversity. The plan provides for their implementation through either a new Natural Preserve Zone, applicable only to Natural Preserves designated on the General Plan Land Use Diagram, or modification of the Garden Highways or Delta Waterways Plan

In 1975 the County transferred jurisdiction over the issuance of encroachment permits within certain designated floodways, including the Cosumnes River, to the State Reclamation Board. Encroachment permits are generally issued for projects impacting the floodway, including irrigation systems construction, vegetation removal, and surface mining operations. The State's review pursuant to permit issuance is single purpose in scope and may be inadequately addressing protection needs of the natural and cultural resources found within the Cosumnes flood plain. In contrast, the County has carefully developed its environmental review process with a multipurpose perspective. Furthermore, in some situations, such as monitoring illegal encroachments, the State Board of Reclamation has suggested county staff could deal more effectively with curtailing unregulated activities. With expanding development, proposals to alter the natural channel of the Cosumnes River will likely increase. To more effectively protect the Cosumnes River and its associated unique resources, the

County should reestablish jurisdiction over encroachments in the Cosumnes River flood plain and regulate so as to minimize impacts on the riparian corridor.

Policies:

- CO-60. Marshland and riparian areas of special significance shall be designated as natural preserves on the General Plan.
- CO-61. Natural Preserves shall not include adjacent irrigated pasture or cropland. However, they may include up to 200 feet of adjoining grassland or grazing area, or up to one-fourth mile of grassland between parallel riparian or marsh areas.
- CO-62. Ensure no net loss of marsh and riparian woodland acreage, values or functions.
- CO-63. Community Plans and specific plans shall include a complete inventory of seasonal and permanent marshland, riparian habitat, and riparian woodland.
- CO-64. Seasonal and permanent marshland within designated natural preserves shall not be drained or filled for the purpose of converting the land to another use.
- CO-65. In any cases where complete or selective removal of riparian woodland or scrub habitat is necessary for channel maintenance, public safety, or installation of infrastructure, it will be planned and carried out, or mitigated, so as to minimize unavoidable impacts upon biological resources.
- CO-66. Encroachments within the designated floodway of Sacramento waterways shall be consistent with policies to protect marsh and riparian areas.
- CO-67. Parcels shall not be created wherein much of the parcel area would comprise marsh or riparian habitat rendering the parcel unbuildable except when within a floodplain corridor or to be dedicated to and maintained by the County for flood control, drainage, and wetland maintenance.
- CO-68. Consistent with overall land use policies, the County shall support and facilitate the creation and biological enhancement of large natural preserves or wildlife refuges by other government entities or by private individuals or organizations. Such areas may, but need not necessarily, function as mitigation banks for other impacts upon biological resources due to development.

Implementation Measures:

- A. Adopt a zoning ordinance creating a Natural Preserve zone which would permit agricultural and passive recreation uses, subject to consistency with Plan policies, and apply to designated natural preserves. (Planning)

- B. Review development and management plans of public agencies owning land in natural preserves for consistency with General Plan policy and amend as appropriate. (Planning, Parks, and Public Works)
- C. Review stream channel maintenance procedures and guidelines for sensitivity to natural areas protection and modify as appropriate. (Planning and Public Works)
- D. Develop model levee maintenance guidelines and procedures and encourage their adoption by local reclamation districts. (Planning and Public Works)
- E. Enter into agreement with the State Reclamation Board to transfer jurisdiction of issuance of encroachments permits to Sacramento County. (Planning)
- F. Investigate the feasibility and appropriateness of applying mitigation banking policy proposed in the Vernal Pools and Ephemeral Wetlands subsection of this Element to marsh and riparian areas. The feasibility study should examine regulatory constraints, analyze successful programs elsewhere, and review the option of allowing mitigation for development in Sacramento County to occur in another jurisdiction.
- G. Investigate feasibility of an ordinance, similar to the weed abatement program, which addresses unauthorized fill.

HABITAT RESTORATION

Objective: Ten percent increase in marsh and riparian woodland habitat, respectively, by 2010.

Intent: Marsh and riparian areas are widely regarded as the most important wildlife habitats in Sacramento County. These habitats are biologically the most complex and provide a diverse range of micro habitats, breeding opportunities, nesting sites, cover, and food. Loss of these natural habitats have occurred to facilitate urban development, accommodate agriculture, and control flooding. Recognizing the need to protect the limited remaining habitat, the U.S. Fish and Wildlife Service, acting as the coordinating agency, has brought together private nonprofit organizations under the Central Valley Habitat Joint Venture Project to preserve and restore wetlands. Within Sacramento County, which straddles the Delta, American, and Yolo basins, public and private agencies are pursuing measures to restore marsh and riparian habitat for migrating waterfowl and resident species. Restoration of habitat, either through private or public efforts, increases the viability of many species dependent upon marsh and riparian environments. However, it is an inexact process and restoration on a 1:1 basis typically does not achieve resource values comparable to those lost. This is primarily due to the complexities of natural areas restoration and the inequalities inherent in replacing a fully functional dynamic ecosystem with a newly restored and potentially less biologically productive area.

The Open Space Strategy Map identifies target areas for wetland/riparian habitat restoration with the symbol * . These areas include the Regional Treatment Plant buffer area, North Stone Lake, Sherman Island, Lower Cosumnes Preserve, Dry Creek/Cherry Island, the multi-cultural park site, Bushy Lake, and portions of Laguna Creek.

Policies:

- CO-69. Review projects for potential to restore marsh/riparian woodlands, considering effects on vernal pools, ground water, flooding, and proposed fill or removal of marsh and riparian habitat.
- CO-70. Public or private projects involving filling or removal of marsh/riparian habitat shall be mitigated outside of natural preserves where on-site mitigation is not desirable or appropriate shall be mitigated through the purchase of mitigation credits for restored wetlands/riparian areas at no net loss.
- CO-71. Community and Specific Plans shall identify potential areas, if any, where marsh or riparian habitat restoration/creation can be undertaken.
- CO-72. New or restored marsh/riparian woodlands shall be under ownership of a public agency or subject to a permanent conservation easement.
- CO-73. Specific restoration/creation areas identified in Community Plans in accordance with Policy CO-71 shall be adequate in characteristics and acreage to accommodate mitigation for likely wetland impacts resulting from development as designated in the respective Community Plans.

Implementation Measures:

- A. Develop and maintain an inventory of wetland and riparian woodland resources in Sacramento County. (Planning)
- B. Incorporate habitat restoration objectives and programs into the:
 - American River Parkway Plan. (Planning and Parks)
 - North Stone Lake Management Plan. (Parks)
 - Master Plan for Dry Creek Parkway. (Parks)
 - Floodplain Management Plans for urbanizing creeks. (Planning, Parks, Public Works)
- C. Develop in-county restoration expertise. (Parks)
- D. Coordinate regularly with restoration efforts of appropriate nonprofit and governmental agencies. (Parks)
- E. Plant native trees and shrubs of significant structure and canopy size along banks of Sacramento River and selected Delta waterways (Reclamation Districts, in conjunction with Sacramento Tree Foundation).

RIVERBANK STABILIZATION

Objective: River banks stabilized to protect levees and riparian values.

Intent: The U.S. Army Corps of Engineers and various reclamation districts undertake levee maintenance and stabilization for flood control and reclamation. Maintenance and stabilization of levees involves repair of erosion damage, placement of slope protection cover, and riparian vegetation removal and control. In some cases current stabilization methods have proven inadequate to protect levees from erosional forces, such as wave action generated from wind and boat wakes. Furthermore, current methods have destroyed much riparian habitat and reduced the biological productivity of in-stream and bankside plant and animal species.

The erosive force of waves is a major factor destabilizing some Delta levees. Along some waterways in the Delta 80 percent of the erosional process is generated by waves from passing boaters. To decrease the impact of wave generated erosion and lengthen the effectiveness of levees, erosive wake activity should be curtailed, especially in areas identified as highly erodible. This will require vigorous enforcement by the County Sheriff, and funds are not available for such a program considering the extent of other public protection needs. A source of revenues dedicated to the enforcement of boating laws is therefore essential to implementation.

Dependence upon conventional levee construction and stabilization methods, such as riprapping, has decimated arboreal, aquatic, and floodplain animal and plant life. An increase in riparian vegetation has the potential to enhance wildlife habitat. Riparian values, while providing food, breeding, and nesting sites for a plethora of riparian fauna, can also moderate the erosive force of flood waters. The intent of these policies is not to enhance riparian values at the expense of sound flood control management. However, whenever possible, restoration of riparian vegetation should be considered as an alternative to conventional methods of flood control.

In some natural areas, specifically along the American River Parkway, bank stabilization may actually benefit existing cultural or vegetation resources by restructuring the natural meander tendencies of the river. Recognizing the differing management techniques available to protect the area's natural character and to preserve important resources, the county should utilize hydrologic and resource analysis to establish meander zones on public lands where no bank stabilization shall occur.

Policies:

CO-74. Reduce dependence on traditional levee protection methods where those methods conflict with habitat preservation efforts and where alternate methods exist which are compatible with preservation efforts and offer an acceptable level of bank stabilization.

- CO-75. Reduce bank and levee erosion by prohibiting erosive wake activity generated by recreational and commercial boating.
- CO-76. Encourage federal, state and local agencies overseeing levee stabilization to investigate and, whenever possible, utilize alternatives to riprapping and other conventional stabilization methods.
- CO-77. Encourage habitat restoration and increasing recreational opportunities as an integral part of stabilization efforts.

Implementation Measures:

- A. Determine extent of bank erosion and undercutting of vegetation along Delta Sloughs and waterways and identify priority areas for no-wake speed protection. (Planning)
- B. Review effectiveness and methodology of integrating riprap and riparian vegetation to stabilize levees. (Planning and Public Works)
- C. Plant sycamore, cottonwood, sandbar willow trees, and other appropriate native trees and shrubs along waterways if advantageous to stabilization of shoreline and not disruptive to levees or hazardous to navigation. (Public Works and Park, in conjunction with the Sacramento Tree Foundation and other tree advocacy groups)
- D. Study feasibility of assessing waterway user fees of which proceeds are earmarked for enforcing boating laws and bank protection on County waterways. (Sheriff, County Counsel)
- E. Study the feasibility of developing an enforcement program involving videotaping of recreational boating activity and utilizing tapes as evidence in citations for violators of no-wake laws. (County Sheriff)
- F. Post vandal-resistant no-wake zones along all County navigable waterways, where wave action is undercutting levees. Place notices of enforcement laws at all marinas and replace both as necessary on a semiannual basis. (County Sheriff and Public Works)

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION V

VEGETATION AND WILDLIFE

B. VERNAL POOLS AND EPHEMERAL WETLANDS

GOAL: Preserve and enhance high-quality, self-sustaining vernal pool habitats.

INTRODUCTION

Vernal pools, depressions on the landscape, collect seasonal rains that support a unique and specialized group of plant and animal species, some identified as rare, threatened or endangered. Spring brings a burst of tiny flowering plants encircling the ephemeral pools used by waterfowl, wading birds, and terrestrial animals. Typically, semi-impermeable soil underlies most vernal pools and restricts downward percolation of collected water. As a result, pool water slowly evaporates during the warming spring months, dispersing plant and animal life, and by summer the shallow basins are often well defined, but dry.

Vernal pools once dotted vast areas of the Central Valley. Today only scattered remnants of this once-expansive resource remain. A sparsely populated portion of Sacramento County, south of Highway 50 and east of the Sacramento River, supports one vestige of the dwindling vernal pool resource. Aerial photography of this area indicates the existence of several thousand vernal pools. This area has not undergone intensive urban development, and the persistence of vernal pools and other natural lands in this region can largely be attributed to the lack of urban expansion and the lack of intensive agriculture.

Reduced vernal pool habitat threatens the continued existence of the many dependent plant and animal species living within them and reduces habitat for migratory waterfowl, shorebirds, and wading birds. Historically, vernal pool losses are attributed primarily to land leveling, agriculture, aggregate mining, and urban development. Currently the greatest impacts to vernal pool habitat are residential, commercial, and industrial development which require extensive areas of natural open space. The rate and momentum of present and anticipated future urban growth have created a need for regional plans designed to ensure the perpetuation of vernal pools and other wetland habitats.

Two laws which have been effectively used to manage, preserve and protect the vernal pool resource are the California Environmental Quality Act (CEQA) and Section 404 of the Clean Water Act (CWA). Both have important shortcomings. Both laws require mitigation for development projects on a case by case basis. Implementation measures for CWA further stress on-site mitigation. This procedure normally does not ensure preservation of a biologically viable vernal

pool system. The Section 404 permit process, overseen by the U.S. Army Corps of Engineers (COE), regulates the placement of dredged or fill materials within the waters of the U.S. However, the program only partially regulates the county's vernal pool resources because small losses, less than 1 acre, are already permitted by a Nationwide permit program.

The current updating of the County's General Plan provides an opportunity to address shortfalls in state and federal law, and represents an opportunity for the county to adopt comprehensive policies on vernal pool preservation, protection, and mitigation.

This section describes policies and programs under six objectives:

1. A system of large, high quality self-sustaining vernal pool preserves representative of the four types of vernal pools in Sacramento County.
2. Urban development directed so as to avoid concentrated vernal pool areas and achieve a balance between essential growth needs and vernal pool resource protection.
3. A mitigation banking program utilizing a credit system consistent with state and federal regulatory programs to enable off-site protection, restoration, creation, and replacement of vernal pools, with incentives for private landowner participation, by 1992.
4. Vernal pool preserves and mitigation banks managed by a public agency or private organization with protection management responsibilities based on area-specific management plans.
5. Local project approval coordinated with state and federal agencies which share jurisdiction over wetlands permits to ensure mutual policy implementation in a timely, cost-effective manner.
6. Community awareness of the importance of vernal pool ecosystems, their preservation needs and their contribution to overall regional environment and quality of life.

VERNAL POOL PRESERVES

OBJECTIVE: A system of self-sustaining vernal pool preserves representative of the four types of vernal pools in Sacramento.

Intent: This objective recognizes and supports state and federal policy that vernal pools are worthy of protection for their unique plant and animal life, age, and seasonal habitat benefits. A viable and biologically successful vernal pool preservation program should encompass the four types of vernal pools found in the county. The four types are: young terrace pools which occur on broad level alluvial deposits, are geologically recent in origin, and support a relatively unspecialized flora; old terrace pools, floristically rich, which have been developing unabated for the last half million years on

ancient pleistocene deposits; mudflow pools which have formed on the upturned edge of ancient mudflow deposits, are recent in origin, and are floristically rich but not particularly specialized; and drainage pools which are associated with active drainages, located on various geologic formations throughout the study area, and contain relatively unspecialized flora. Inventory and survey work to date on these pools includes aerial photo interpretation and limited spot field checking. Further field research should be conducted to identify extra-sensitive vernal pool areas and to enhance scientific and management knowledge necessary to implement preservation programs.

The policies below give guidance for prioritizing sites based on evaluation criteria and identifying pressures detrimental to the resource. Additional description of preserve evaluation criteria may be found in the report "Sacramento County Vernal Pools", dated 1990.

Policies:

- CO-78. Focus vernal pool preservation in permanent open space areas beyond the Urban Area.
- CO-79. Strive to link preserves in the County system and create a network that encompasses all vernal pool types.
- CO-80. Select vernal pool preserves based on the following evaluation criteria: representativeness, habitat quality, watershed integrity, defensibility, buffer, preserve size, plant species variety, and presence of special status species.
- CO-81. Ensure that vernal pool preserves are large enough to protect vernal pool watersheds, provide an adequate buffer, have sufficient number and extent of pools to support adequate species populations and a range of vernal pool classes.
- CO-82. Establish criteria and guidelines addressing the need for siting and management of natural preserves. At a minimum, the following should be considered:
 - resource(s) to be lost, restored and/or replaced, -functional values,
 - mitigation alternatives, including mitigation banks.

Implementation Measures:

- A. Inventory the location, extent, biotic and physical characteristics, special status species distribution, quality, and preservability of vernal pools. (Planning)
- B. Identify, evaluate, and rank candidate vernal pool preserve sites. (Planning)
- C. Identify opportunities for establishing and maintaining preserves at priority sites based on financial, land use planning, and policy consistency considerations. (Planning and Parks)

DEVELOPMENT AND VERNAL POOLS

Objective: Development directed so as to avoid concentrated vernal pool areas and achieve a balance between essential growth needs and vernal pool resource protection.

Intent: Federal regulations regarding wetland protection apply to vernal pools, yet the emphasis on vernal pool protection is relatively recent. The U.S. Fish and Wildlife Service has in the past and will likely continue in the future to focus mitigation measures for loss of wetlands, including vernal pools, on on-site protection and mitigation of impacts. This method, although relatively sound in nonurbanizing areas, can create isolated resource fragments of minimal value scattered throughout developing areas. Furthermore, on-site mitigation has created significant difficulties for the development community in their attempts to urbanize areas in accordance with adopted land use plans. Although this plan does designate much of the vernal pool resource as open space, considerable vernal pool acreage is in areas planned for urban and agricultural/residential development. On-site protection of vernal pools scattered amongst development does not promote either long-term, viable vernal pool communities or well planned, efficient development.

The policies below lay out a framework for evaluating vernal pool resources through CEQA and establishing a basis for off-site mitigation. Off-site mitigation does diverge from federal guidelines and will require careful consideration of resource benefits, preservation procedures, and negotiations with federal agencies sharing jurisdiction over vernal pool resources. Additional key guidelines are no-net loss of vernal pools, in-kind compensation for impacted vernal pool types and functional values, and at appropriate mitigation involving replacement of lost pools and protection and enhancement of existing off-site vernal pools and associated upland watersheds. The no net loss policy, CO-83, is intended to protect or mitigate vernal pools impacted by development. It is not intended to regulate standard agricultural practices affecting vernal pools on agricultural property.

Policies:

- CO-83. Ensure no net loss of vernal pool acreage, and/or values and functions, and mitigate any loss in relation to the values of quality of habitat.
- CO-84. Evaluate feasible on-site alternatives in the environmental review process that reduce impacts on vernal pools and provide effective on-site preservation in terms of minimum management requirements, effective size, and evaluation criteria identified in the report "Sacramento County Vernal Pools" (1990).
- CO-85. Require in-kind compensation for the type and functional values of vernal pools eliminated by development.

CO-86. When on-site preservation or mitigation is infeasible or undesirable, require off-site mitigation at County-approved mitigation banks within Sacramento County.

CO-87. Mitigation for vernal pool loss shall be considered in the environmental review process, and mitigation shall be required based on information contained within the environmental documents on the quality of those resources and their ability to be sustained within an urban setting.

MITIGATION BANKING PROGRAM

Objective: A mitigation banking program utilizing a credit system consistent with state and federal regulatory programs to enable off-site protection and replacement of vernal pools, with incentives for private landowner participation, by 1992.

Intent: Mitigation banking is broadly defined as habitat protection improvement actions taken expressly for the purpose of compensating for unavoidable, necessary losses from future growth inducing actions. They are created in anticipation of future losses and prior to the time of impact. Mitigation banking requires identifying locations where in-kind resources can be protected and additional pools enhanced or created in important, high-quality vernal pool areas. Creation of a mitigation bank is not intended to negate or eliminate the need to consider on-site mitigation. The intent is to preserve existing vernal pool areas in the context of larger regional wetlands and identify restoration areas where suitable conditions exist to restore and create vernal pool habitat. Since debate on creation efforts is ongoing specific guidelines will need to be formulated to define the distinction between restoration and creation.

It should not be individual project applicants' responsibility to identify off-site mitigation locations or to prepare a plan for the management and maintenance of the area. Initial experience indicates that significant problems exist in regards to preservation location, size, and management. For such a preservation program to be viable, appropriate areas must be identified and bank procedures formulated. In addition, to successfully preserve and monitor vernal pool protection and oversight committee or agency will be necessary to implement guidelines and procedures.

A key aspect of preservation involves establishing a variety of banks to foster competition among a diversity of mitigation options. A second key aspect involves incentives to banks. This is essential since voluntary cooperation of ranchers is vital to maintain the many thousands of acres of vernal pools for which public agency ownership is not possible, suitable, or warranted.

Policies:

- CO-88. Foster competitive pricing for mitigation bank credits by allowing government agencies, non-profit organizations, and private landowners to establish vernal pool preserves, designate mitigation areas, create and restore vernal pools, and sell credits to developers for off-site mitigation.
- CO-89. Proposed mitigation banks shall be consistent with evaluation and size criteria for vernal pool preserves identified in the report "Sacramento County Vernal Pools" (1990), unless compelling circumstances justify otherwise.
- CO-90. Prioritize creation of mitigation banks in areas where sites suitable for creating new vernal pools exist in close proximity to existing vernal pools.
- CO-91. The determination of mitigation bank credits shall be based on the ecological values of the area and distinguish between the type of vernal pool. Mitigation bank credits shall also distinguish between the type of mitigation: preservation, restoration, or creation.
- CO-92. Mitigation credits for vernal pool creation or restoration shall not be offered for sale by landowners until monitoring of new or restored areas determines that pre-established criteria in the management plan for species diversity, health and stability are met.
- CO-93. The landowner shall dedicate development rights to the County for the land area applicable to the sale of mitigation credits at the time of the credit sale.
- CO-94. Mitigation bank property owners shall be eligible for tax incentives and/or compensation for income reduction attributable to vernal pool preserve management provided that they:
- a) enter into a Williamson Act Contract
 - b) prepare and implement a County approved management plan, and
 - c) document income reduction attributable to vernal pool protection efforts

Those portions of the mitigation bank for which mitigation credits have been sold shall not be eligible for tax incentives or operation loss compensation.

CO-95. Until such time as mitigation credits consistent with the above policies are available, development entitlements involving filling or removal of vernal pools may be granted provided that the project applicant:

- a) purchase and dedicate the development rights for a vernal pool preserve, the extent of which shall not be less than the acreage of vernal pool and upland watershed necessary to sustain the viability of the the pools that are proposed to be developed, and, which, in conjunction with adjoining planned vernal pool preserves, will provide a long-term, ecologically viable preserve.
- b) prepare a mitigation and management plan for the preserve area consistent with policies of this section.
- c) Enter into a long-term agreement with an agency or organization qualified to create, manage and monitor vernal pools.
- d) Post bond guaranteeing the management funding for a minimum of 50 years.
- e) Obtains permission from the U.S. Army Corps of Engineers.
- f) Demonstrate that no rare, threatened or endangered species occur on the site.

CO-96. Prior to adoption of the mitigation banking ordinance, utilize on a county-wide basis, the adopted interim wetland mitigation/compensation policy: All wetland acreage proposed to be disturbed by any project over which the Board of Supervisors has discretionary approval shall be mitigated/compensated for by either one or a combination of the following methods:

- 1) Preserve or create wetlands sufficient to result in no net loss of wetland acreage, and protect their required watersheds as is necessary for the continued function of wetlands on the project site. The appropriate hearing body shall determine that project design, configuration, and wetland management plan, provide reasonable assurances that the wetlands will be protected and their long-term ecological health maintained.
- 2) Where a Section 404 Permit has been issued by the Corps of Engineers, or an application has been made to obtain a Section 404 Permit, the Mitigation and Management Plan required by that permit or proposed to satisfy the requirements of the Corps for granting a permit may be submitted for purposes of satisfying paragraph 1, provided a no net loss of wetlands is achieved and, provided, further, that such mitigation and management plan shall be subject to the independent, discretionary approval of the Board of Supervisors.

Implementation Measures:

- A. Identify mitigation bank sites suitable for in-kind replacement of vernal pool types through creation, restoration or enhancement activities. (Planning)
- B. Evaluate options and recommend appropriate agency for administering mitigation credit system. (Planning)
- C. Establish guidelines and rules for offering mitigation bank credits for sale and for assigning credits. (Planning)
- D. Develop program recommendations and funding sources for tax incentives and operation loss compensation. (Planning)

VERNAL POOL MANAGEMENT

Objective: Vernal pool preserves and mitigation banks managed by a public agency or private organization with protection management responsibilities based on area-specific management plans.

Intent: Preserve management requires an oversight committee that should consist of representatives from the county, regulatory agencies, conservation organizations, and, perhaps most importantly, land owners. Success of long-term preservation goals and strategies is dependent upon cooperative management agreements between landowners and the oversight committee. Responsibilities of the committee would include allocating funding for preserve maintenance, determining acceptable uses for preserve and mitigation banks, and overseeing a preserve manager to implement committee goals and manage day-to-day activities. The committee would also consider long-term monitoring needs vital to preserving physical features and natural elements of preserves and reviewing cooperative management agreements. In addition, maintenance and remedial needs, such as harricade repair, seed sowing, soil reconstruction, and pool restoration, should be long-term responsibilities of the committee.

Policies below emphasize site specific management plans based on minimum management requirements and long-term management funding which ensure viable and long-term success for maintaining biologically diverse and complex pool systems.

Policies:

- CO-97. Limit land uses within established preserves to activities deemed compatible with maintenance of the vernal pool resource, which may include ranching, grazing, passive recreation, scientific study and education.
- CO-98. Preserves shall be planned and managed so as to protect adjacent agricultural activities and avoid conflicts.

- CO-99. Ensure that minimum management requirements for vernal pool preserves and mitigation banks include protection in perpetuity through acquisition of fee title or a permanent conservation easement; a funding source for long-term operation, maintenance, and management; preparation and implementation of a management plan; and establishment of an interagency oversight committee.
- CO-100. The price of mitigation credits offered for sale to compensate for vernal pool losses shall incorporate estimated management costs for a minimum of 50 years.
- CO-101. The agency responsible for overseeing the mitigation bank program shall license private individuals or organizations prior to their assuming vernal pool creation and management responsibilities, and establish appropriate license fees to fund periodic monitoring of mitigation bank management.

Implementation Measures:

- A. Determine the appropriate agency for overseeing the mitigation bank program, the composition of any advisory or decision making body, staffing, funding, and compensation. (Planning)
- B. Establish guidelines for the content and development of site-specific management plans, minimum requirements, and qualifications for management of vernal pool preserves or mitigation banks, bonding requirements and monitoring of vernal pool creation and restoration. (Planning)

WETLANDS REGULATION COORDINATION

Objective: Local project approval coordinated with state and federal wetlands permits to ensure mutual policy implementation in a timely, cost-effective manner.

Intent: Given the number of agencies with important regulatory roles, coordination is essential to establishing effective local programs. It appears that two federal directed programs, Special Area Management Plans (SAMP) and Advance Identification (ADID), may be a viable method to facilitate coordination and implementation of programs. The SAMP process, directed by district offices of the U.S. Army Corps of Engineers, is initiated when regulatory officials identify a trend in permit applications with potential to degrade especially valuable resources and determine that the resource and agency budgets are better served by planning than regulating. The ADID process, initiated by the Environmental Protection Agency (EPA) and guided by Section 404 of the Clean Water Act, predetermines ecological attributes and wetlands suitability prior to permit application. Predetermination is intended to guide and expedite the decision-making process. No guarantee is implied for permit issuance approval or denial.

Finally, a policy to foster coordinated application processing is essential to avoid situations where projects fully approved by the county must undergo substantial redesign of a Corps 404 permit requirement, followed by reapproval by the county. Such actions complicate and frustrate the planning process and make implementation of other General Plan objectives more difficult.

Policies:

CO-102. The County will provide information to applicants with projects in potential wetland areas and provide coordination assistance with the Army Corps of Engineers in order to facilitate the development review and Section 404 permit review processes.

Implementation Measures:

- A. Develop procedures, forms, and information handouts which facilitate coordination of the development review and Section 404 permit review processes. (Planning)
- B. Evaluate the feasibility of a SAMP or an ADID program to coordinate and expedite County federal permit processes. (Planning)
- C. Adopt a Memorandum of Understanding (MOU) or cooperative agreement with COE and EPA whereby: 1) all vernal pool losses authorized under the Section 404 General (nationwide or regional) Permit Program are mitigated or compensated for; and 2) local and federal commitments to implement a SAMP plan or other wetlands protection plan are identified.

COMMUNITY AWARENESS OF VERNAL POOLS

Objective: Community awareness of the importance of vernal pool ecosystems, their preservation needs and their contribution to the overall regional environment and quality of life.

Intent: If protection efforts are to be successful, the County will need to develop interpretive and educational programs for public enjoyment and outreach presentations. Greater knowledge and appreciation of the vernal pool ecosystem and their ephemeral nature will strengthen public support for preserving the resource. Community awareness forums and workshops regarding mitigation banking methodologies and implementation measures will assist landowners and interested citizens in familiarizing themselves with the benefits of such programs. Educational and informational presentations and publications will assist the County in protecting and managing an important element of the area's wetland resources.

Implementation Measures:

- A. Develop vernal pool educational and interpretive program for incorporation into Recreational Element of this plan.

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION V

C. URBAN STREAMS

GOAL: Natural and open space values of urban stream corridors preserved and protected.

INTRODUCTION

Sacramento County is traversed by a series of naturally occurring water courses. In much of the urban area these creeks, streams, and tributaries are the only significant natural areas containing open space and associated values. Stream corridor values were originally recognized by the County in the 1970's with the creation of a Natural Streams Task Force. Their charge was to prepare a plan to preserve and protect natural, recreational, and floodplain features in the stream courses of the northeast section of the County. Recommendations submitted by the Task Force were adopted in 1980 as the Natural Stream Plan. The County subsequently adopted and applied a Natural Streams (NS) combining zone to the northeast area's natural streams.

Preservation of floodplain, water quality, recreation, and habitat values of stream corridors is increasingly important. Natural floodplains provide necessary drainage during storm runoff, minimizing flooding impacts of most seasonal storms. Unregulated fill of floodplains may restrict flood flows, can destabilize hydrologic processes, and increase risk to human health and safety. Stream water quality values are degraded by urban runoff pouring nutrients, pollutants, and silt into drainages from streets, roofs, and drives. Reduced water quality can be tempered by allowing controlled amounts of in-stream vegetation to assimilate suspended sediment and chemical compounds. Recreational attributes of stream corridors provide walking, hiking, bicycling, and nature observation opportunities. Such activities are appropriate with the natural character of stream corridors and have minimal impact upon wildlife. Habitat values of stream corridors are beneficial to wildlife allowing healthy interaction between species, broadening feeding ranges and breeding opportunities, and maintaining genetic diversity. Habitat corridor preservation, a comparatively recent wildlife management concept, is increasingly recognized as the most effective method to protect species by preserving ecological landscapes.

The Open Space Preservation Strategy Map identifies Urban Stream Corridors in Sacramento County. Urban Stream Corridors include both urban and urbanizing streams. Urban streams, found in the northeast section of the county flow through a developed urban landscape and are zoned (NS) to protect natural features and regulate fill to preserve flood control values. Urbanizing streams, occur predominantly south of the American River, have wider floodplains, and meander through relatively flat terrain. Much of the property

adjacent to these stream corridors remains undeveloped, but lies within areas planned for urban development. The policies and programs in this section apply to the designated Urban Stream Corridors on the Open Space Preservation Strategy Map. These designated streams are Morrison, Elder, Laguna Creeks, Laguna's southern tributary, and Dry Creek in Rio Linda. In some cases, there is a distinction between urban streams zoned (NS) and streams in urbanizing areas. In such cases, distinctions are clearly indicated.

The focus of the following policies is on urban and urbanizing waterways, not necessarily rural stream courses. The threat of development to rural streams is comparatively less since they pass through land designated agricultural and stream channel modifications require a permit from the State Fish and Game Department under provisions of Statutes 1600-1605 of the Fish and Wildlife Protection and Conservation Code. Policies pertaining to rural stream flooding and riparian habitat are found in the Health and Safety Element and the Marsh and Riparian Habitat Section of the Conservation Element, respectively.

This section describes policies and programs under five objectives:

1. Natural 100-year floodplain maintained by limiting fill.
2. Limit channel modifications to protect and restore natural stream values.
3. Land uses within and adjacent to urban stream corridor consistent with natural values.
4. Adequate funding for maintenance and law enforcement to protect natural values of urban stream corridors.
5. Restoration of channelized creeks to increase natural values.

LIMITATION OF FILL IN FLOODPLAINS

Objective: Natural character of 100-year floodplain maintained by limiting fill.

Intent: Drainage capacity and hydrologic character of streams can be significantly changed by urban development. Land filling within the 100-year floodplain has been used to accommodate the needs of development proximal to the stream courses. Land filling of floodplains and increased impervious surface area associated with urbanization cause alterations in the hydrology, hydraulics, and flood flow capacity of stream channels, which may ultimately necessitate stream channelization to accommodate the resulting flows. To avoid this, programs must be implemented which control or eliminate fill, depending upon the circumstances within the 100-year floodplain. The objective is to rely predominantly on the natural character of the floodplain to carry future flood flows, while recognizing that some filling of shallow fringe areas can occur without compromising the objective. In this regard, the completion of a

comprehensive drainage plan for urbanizing creeks (see Safety Element) is essential. The first fill policy pertains only to designated Urban Stream Corridors south of the American River. Fill regulations pertaining to natural streams of the northeast area are already in place. The 600-foot minimum width of the corridor helps to ensure sufficient width to provide for an open space buffer, wildlife habitat corridor and recreational use objective.

Policies:

- CO-103. Allow no fill in the 100-year floodplain as delineated by currently effective FEMA Flood Insurance Rate Maps or subsequent comprehensive drainage plans adopted by the County unless the fill would cause no increase in flood surface elevation; in the absence of a floodway master plan the resulting floodplain would not be less than 600 feet in width or actual width of the floodplain, whichever is less, except at road crossings; depth of fill would not exceed two feet, except as may be specified for drainage swales in a comprehensive drainage plan; the proposed fill area is not necessary to serve as a detention basin for stormwater runoff; and no wetlands as defined by the U.S. Army Corps of Engineers exist within the proposed fill area.
- CO-104. Remove unauthorized fill within the 100-year floodplain at the property owner's expense.

Implementation Measures:

- A. Review all development projects for fill policy compliance. (Planning)
- B. Develop enforcement ordinance modeled after weed abatement program whereby illegal fill is removed at property owner's expense. Enforcement cost can be collected through liens on property taxes. (Public Works)
- C. Survey the county to locate 100-year floodplain elevations (see Health and Safety Element).

CHANNEL MODIFICATIONS

Objective: Channel modifications which protect and restore natural stream values.

Intent: Stream courses provide necessary drainage for stormwater runoff, as well as, open space, aesthetic, and recreational values to urban neighborhoods where the stream course may be the only nearby area to contain, or have the potential to contain, natural values. In addition, stream corridors cool and cleanse the air, improve water quality through natural filtration processes, provide habitat for wildlife, and potentially link larger habitat areas. Modification of stream corridors for flood control purposes should consider and demonstrate sensitivity toward topographic variations of naturally occurring streams and ecological diversity of wildlife species and

associated stream-side habitat. To this end, urban stream corridors designated under the open space strategy diagram and other stream courses within Urban Service Boundary, should be master planned to reduce, to the maximum extent possible, impacts on natural values. Policy 115 pertains to stream course identified as urban stream corridors and those not identified as such. Additional pertinent policies are contained in the Safety Element.

Policies:

- CO-105. Channel modification projects within Urban Stream Corridors shall be considered for approval by the Board of Supervisors only after conducting a noticed public hearing examining the full range of alternatives, relative costs and benefits, and environmental, economic, and social benefits.
- CO-106. Channel realignment within Urban Stream Corridors shall be permitted only when necessary to eliminate flood hazards; it is necessary to protect and preserve natural features and vegetation which would otherwise be removed; it is necessary as a result of surface mining within the floodplain; or the existing channel has been significantly disrupted by agricultural improvements or other man-made changes.
- CO-107. To the maximum extent practical retain topographic diversity and variation when channels are realigned or modified, including maintaining meandering characteristics, varied berm width, naturalized side slope, and varied channel bottom elevation.
- SA-108. Natural appearance channels will be encouraged for watercourses in newly developing areas (outside of identified in-fill areas).
- CO-109. Channel lowering shall occur after consideration of alternatives and only when it is necessary to accommodate the gravity drainage of storm runoff and/or accommodate floodflows under existing bridge structures.
- CO-110. Channel modifications shall not prevent minimum water flows necessary to protect and enhance fish habitats, native riparian vegetation, water quality, or ground water recharge.
- SA-111. Improvements in watercourses in currently undeveloped areas will be designed for low maintenance. Appropriate Manning's "n" values will be used in design of the watercourses to reflect future vegetative growth (including mitigation plantings) associated with the low maintenance concept.
- CO-112. Channel modifications shall retain marsh and riparian vegetation whenever possible or otherwise recreate the natural stream channel consistent with the ecological integrity of the preexisting stream. Modifications resulting in wetland or riparian loss shall be mitigated.

- SA-113. The placement of concrete within watercourses will be strongly discouraged. However, it will not be prohibited in identified in-fill areas where it is consistent with the existing adjacent reaches of the watercourse.
- CO-114. Encourage revegetation of native plant species and avoid nonindigenous species.
- CO-115. Sacramento County stream courses within the Urban Service Boundary shall be planned so as to protect natural values.
- CO-116. Where there is extensive existing riparian vegetation, consider construction of secondary flood control channels for flood control purposes.

Implementation Measures:

- A. Develop a program to examine potential benefits of utilizing Urban Stream Corridors for off-site mitigation of upland development.

LAND USE ADJACENT TO URBAN STREAMS

Objective: Land uses within and development adjacent to the Urban Stream Corridor consistent with natural values.

Intent: Development near or within stream corridors affects the area's natural integrity and can, if appropriately designed, enhance habitat value, decrease flood damage potential, increase water quality, and generally heighten the natural values of a water course for wildlife use and human enjoyment. A nearby stream corridor should be considered an attribute to any developing community. By integrating stream values into plan design new development proximal to a stream corridor will realize benefits in the form recreational opportunities, greenbelt amenities, and neighborhood identity. It is especially important that adjacent development design relate positively to the stream corridor and not isolate it with backyard fence lines. To enhance user opportunities, public easements or ownership along stream corridors should be considered for placement of recreational paths. In contrast, minimizing or eliminating roads or parking within the corridor protects the ecological niche from disruptive intrusions and encourages passive use of the area. Policies below are not meant to supersede or demonstrate inconsistency with already existing provisions of (NS) zoning protecting creeks in the northeast section of Sacramento County.

Policies:

- CO-117. Provide a transition zone adjacent to stream corridors which incorporates:
- 1) A buffer zone on each side of the stream, between the outer edge of any existing or planned riparian or wetland vegetation and more intensive uses.
 - 2) The transition zone for stream corridors shall provide sufficient width to allow a minimum 50 to 150 foot natural buffer, a 20 foot mowed fire break at the outer edge, sufficient additional width to provide for access for channel maintenance and flood control and for planned passive recreation uses.
 - 3) The width of the natural buffers shall be based on:
 - a. quality and quantity of existing and planned habitat,
 - b. presence of species as well as species sensitivity to human disturbance,
 - c. areas for regeneration of vegetation,
 - d. corridor for wildlife habitat linkage,
 - e. nature of planned urban uses adjacent to the corridor,
 - f. need for community greenways, and
 - g. the effective use of active barriers.
 - 4) The transition zone shall not include containment ponds for other features implementing pollutant discharge requirements.
 - 5) Master drainage plans may provide for other standards that meet the intent of this policy.
- CO-118. Uses within the Urban Stream Corridor shall be limited to recreation and agricultural uses compatible with resource protection and flood control measures. Turfed areas are acceptable provided the natural grassland buffer is maintained.
- CO-119. Roads, parking, and associated fill slopes shall be located outside of the Urban Stream Corridor, except at stream crossings. Crossings shall be minimized and be aesthetically compatible with naturalistic values of the stream channel.
- CO-120. Development design shall minimize the total floodplain frontage which is fenced off from public view. Development adjacent to Urban Stream Corridors shall be encouraged to provide where physically reasonable a public street paralleling at least one side of the corridor with vertical curbs, gutters, foot path, street lighting, and post and cable barriers to prevent vehicular entry.
- CO-121. Urban Stream Corridor trails shall be primarily located beyond the riparian corridor and wetlands to minimize wildlife impacts and shall be restricted to non-motorized traffic.
- CO-122. Secure easement or fee title to open space lands within corridor as a condition of development approval.

MAINTENANCE OF URBAN STREAMS

Objective: Adequately funded maintenance and law enforcement programs to protect natural values of Urban Stream Corridors.

Intent: Normal maintenance of stream channels consists primarily of removing drainage obstructions, abating weeds, maintaining recreational facilities, collecting refuse, and, when desirable, removing exotic plants and replanting with native species. The dumping of trash onto the floodplain degrades stream values and water quality by reducing aesthetics, modifying stream flow, and polluting the water. Vegetation removal programs should consider the benefits of plant life for enhancing habitat and water quality values compared to the effect of the increased coefficient of friction on flood flows. To ensure that stream corridor values are maintained and enhanced, regular maintenance should be conducted and citations issued to deter those denigrating the stream corridor.

Policies:

- CO-123. Accept ownership and maintenance responsibility of lot A open space parcels within Urban Stream Corridors provided the lot(s) have good access, are not small or isolated, local park districts are unwilling to accept ownership responsibility, maintenance by a viable homeowners' association is not feasible, and there is no other feasible alternative.
- CO-124. Development projects adjacent to the Urban Stream Corridor shall provide unencumbered maintenance access to the stream as necessary and consistent with policies of this plan.
- CO-125. No grading, clearing, tree cutting, debris disposal or any other despoiling action shall be allowed in Urban Stream Corridors except for normal channel maintenance.
- CO-126. Maintain streams to allow natural vegetation in and along streams, commensurate with flood control and public acceptance, to assist in removal of nutrients, pollutants, and silt.
- CO-127. The use of special-status plant species, especially candidate 1 or 2 species, shall be encouraged on revegetation plans, if and only if such plant material can be propagated from local genetic stocks without significant adverse impacts upon the existing populations.

Implementation Measures:

- A. Regularly survey and maintain stream channels to remove trash debris and clear obstructions which present a drainage hazard. (Public Works)

- B. Expand weed abatement program to include trash removal, improve cost accounting, increase administrative fee charges for violations to recover most program costs, and report annually to Board of Supervisors on program. (Public Works)
- C. Create a benefit assessment district, maintenance fee charge, or other method of supporting a maintenance program for urban streams which supplements normal channel maintenance. (Public Works and Parks)
- D. Create an oversight committee composed of staff representatives from County departments having administrative responsibility over one or more aspects of stream corridor management. The group shall meet regularly to promote active and effective protection, maintenance, and enforcement programs. (Public Works)
- E. Develop improved accounting for stream maintenance costs which distinguish relative cost for natural and concrete lined stream courses. (Public Works)
- F. Prepare an annual report on the implementation of the Natural Streams Plan. (Planning)
- G. Prepare procedures in cooperation with local fire districts for maintaining fire protection within natural stream corridors.

RESTORATION OF URBAN STREAMS

Objective: Restoration of channelized creeks to increase natural values.

Intent: Efforts toward increasing natural values of channelized creeks, some of which are concrete lined, may be restricted to planting and maintaining native vegetation and stabilizing eroding banks. Limited vegetation restoration adjacent to channels and minor bank reconstruction sensitive to wildlife needs can moderate water temperature, increase species propagation, and provide nesting sites, cover and food without impacting flood control values. In addition, such restoration of channelized creeks can significantly enhance aesthetic and recreation values. To implement restoration procedures, channelized streams should be identified, resource inventories conducted, and restoration plans developed. Funding for restoration of creeks in urbanizing areas should come from developer fees or from public and private grants. The county should consider adjusting drainage fees so that about two percent of drainage fees collected from new development would be utilized to fund channel restoration projects.

Implementation Measures:

- A. Survey all channelized streams in the unincorporated area and identify restoration opportunities. Develop an Urban Creek Restoration Plan. (Public Works)

- B. Create a Creek Restoration Task Force to oversee plan development and implementation. (Public Works and Planning)
- C. Apply for urban stream restoration grants from the Department of Water Resources to provide supplemental funding. (Public Works)
- D. Implement restoration plans. (Public Works)

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION V

VEGETATION AND WILDLIFE

D. TREE RESOURCES

GOAL: Sacramento trees preserved and protected.

INTRODUCTION

The Sacramento County tree resource includes native trees and non-native trees in both rural and urban environments. Trees native to the county include the valley oak, blue oak, interior live oak, cottonwood, sycamore, and willow. These trees, found in rural and urban areas, propagate and grow under natural conditions. Non-native trees predominate in the urban environment having been selected and planted because of ornamental value, shade producing characteristics, general resistance to particular pests, or proven adaptation to urbanization. This section focuses primarily on native rural blue oak woodlands and the urban forest. Additional policies pertinent to riparian vegetation are found in the marsh and riparian section of this element.

Over the years, a significant number of native trees have been removed to facilitate urban development, accommodate agriculture, provide fuelwood or have been milled for building materials. It is clear that with continued urban and rural development, the county's oak woodlands and isolated groves will disappear unless concerted efforts are pursued to protect the resource. To ensure native woodlands remain a viable element of the county's natural landscape, land management must be sensitive to healthy propagation of native trees. To this end, County policy should protect the historical attributes and future values of rural woodlands.

Trees in urban areas provide aesthetic and environmental benefits to residential and commercial areas. Trees enhance a community's livability by softening street noise, and enhancing pedestrian use. Trees also provide a cool green canopy of shade to reduce the heating effects of summer sun and consequently reduced energy consumption to cool buildings. The urban forest in Sacramento has provided distinct identities for local neighborhoods and has reduced summertime temperatures by minimizing reflective heat. As the county's urbanized area expands the need for trees and associated canopy cover will grow greater. Since an urban forest is not static, the planting and maintenance of trees will be required to encourage healthy growth and to protect the biologic well being of the urban forest. It is the intent of this section to form a framework which shall preserve and protect Sacramento County's tree resources and guide the County in formulating a comprehensive tree management and propagation program.

This section describes policies and programs under five objectives:

1. Tree management practices to promote a 10% increase of oak regeneration in designated oak woodlands.
2. Native and landmark tree resources preserved.
3. "Tree County USA" status achieved by 1995.
4. One million new trees planted within the urban area between now and 2000.
5. Urban tree management practices which promote trees as economic and environmental resources.

OAK REVEGETATION

Objective: Tree management practices to promote a 10% increase of oak regeneration in designated oak woodland resource conservation areas by the year 2000.

Intent: Due to the combined effects of grazing, the introduction of non-native grasses, and fuel wood harvesting, California's oaks have been unable to maintain existing populations. The California Department of Forestry and Department of Fish and Game have recognized the statewide decrease in oak tree propagation, and have developed the Integrated Hardwood Range Management Program to improve oak regeneration. In support of the State's efforts, the County will initiate cooperative programs with the State to protect native oak woodland. The programs will implement such management techniques as sustained yield fuelwood harvesting, habitat enhancement, and grazing practices that encourage oak propagation. Implementation of these programs will require the County Parks Department to expand resource protection measures and increase funding for tree management programs. These programs will help ensure future regeneration of native trees by increasing opportunities for oak propagation within the county.

Additional programs to acquire and protect representative examples of established woodland areas are included as part of the open space preservation strategy.

Policies:

- CO-128. Allow firewood harvesting of oak woodlands only on a sustained yield basis.
- CO-129. Protect oak woodlands from adverse effects of grazing.

Implementation Measures:

- A. Determine current extent of oak woodland resources in Sacramento County. (Planning)
- B. Cooperate with and assist the California Division of Forestry in studies to identify factors inhibiting oak tree regeneration and techniques to increase the rate of oak tree propagation. (Parks)
- C. Establish an oak revegetation program, in cooperation with cooperating property owners, to enhance oak tree propagation by identifying optimum areas for oak regeneration, planting seedlings, and temporarily fencing or protecting them to enhance survival during critical early growth periods. (Parks)
- D. Provide, in cooperation with the University of California Division of Agriculture and Natural Resources, educational materials and workshops for landowners which identify hardwood range ecological concerns and management alternatives. (Parks)
- E. Develop a cooperative program with California Division of Forestry to monitor the health and status of oak woodland resources. (Planning and Parks)
- F. Develop program scopes, staffing requirements, financing sources, cost estimates and time table for implementing the above measures. (Planning and Parks)
- G. Develop grazing management plans with appropriate controls to ensure oak tree propagation on public lands. (Parks)
- H. Amend the Zoning Code Ordinance to require a use permit for commercial harvesting of oaks subject to an approved revegetation plan which achieves oak propagation objectives. (Planning)

NATIVE AND LANDMARK TREE PROTECTION

Objective: Native oak woodlands resources and landmark tree resources preserved and protected for their historic, economic and environmental values.

Intent: With increasing development, the removal of oaks and other native trees is occurring at an accelerated rate to the detriment of woodlands and associated environmental, historical, biological, and aesthetic values. Preservation of native and landmark trees enhances the county's landscape, increases property values, conserves energy, reduces soil erosion, provides natural wildlife habitat, and preserves natural heritage values. To preserve these values an inventory of the County, conducted over a number of years by staff, interns and volunteers, will identify existing mature native and

landmark trees for protection. The County's current Tree Preservation Ordinance does recognize the value of preserving trees, especially oaks, and seeks to protect the resource by preserving all native trees in the urban area through its development review process. However, the ordinance does have shortcomings which additional policies and programs seek to remedy by providing guidance for directing tree preservation efforts. One such shortcoming is the tendency to preserve mature trees, especially oaks, with inadequate consideration for regeneration opportunities or tree canopy. Tree canopy is the plan view of a tree's crown at full foliage. Maintaining an area's tree canopy can provide opportunities for second generation growth which will eventually replace first generation growth. In addition, the canopy provides aesthetic values and energy conservation benefits. It should be noted the intent of these policies is to preserve and protect the tree resource, not to saddle property owners with regulations that overly interfere with development

Conservation of native tree species other than oaks, and preservation native oaks and landmark trees is the intent of policies in the section. Landmark trees are generally defined as any non-native oak tree measuring 19 inches in diameter at breast height. Native oak trees which measure six inches in diameter at breast height are protected under provisions of the County Tree Ordinance. Policy CO-131 should apply only to non-discretionary projects and seeks protection for oaks and other native species, excluding cottonwoods. Policy CO-133 should only apply to discretionary projects.

Policies:

- CO-130. Make every effort to protect and preserve non-oak native, excluding cottonwoods, and landmark trees and protect and preserve native oak trees measuring 6 inches in diameter at 4.5 feet above ground in urban and rural areas, excluding parcels zoned exclusively for agriculture.
- CO-131. Native trees other than oaks, which cannot be protected shall be replaced with in-kind species in accordance with established tree planting specifications, the combined diameter of which shall equal the combined diameter of the trees removed. In addition, with respect to oaks, a provision for a comparable on-site area for the propagation of oak trees may substitute for replacement tree planting requirements at the discretion of the County Tree Coordinator when removal of a mature oak tree is necessary in accordance with consistent policy.
- CO-132. If the project site is not capable of supporting all the required replacement trees a sum equivalent to the replacement cost of the number of trees that cannot be accommodated shall be paid to the County's Tree Preservation Fund. The replacement cost of trees shall be established in accordance with the Council of Tree and Landscape Appraiser's standards for appraising trees.

- CO-133. For discretionary projects involving native oaks, ensure no net loss of canopy area by (1) preserving the main, central portions of consolidated and isolated groves constituting the existing healthy and unhealthy native oak canopy and (2) provide an area on-site to mitigate any canopy lost. Native oak mitigation area must be a contiguous area on-site which is equal to the size of canopy area lost and shall be adjacent to existing oak canopy to ensure opportunities for regeneration. If on-site mitigation area is not available due to area limitations, developer shall provide off-site mitigation consistent with policy proposed in CO-136.
- CO-134. Mitigate for loss of trees for road expansion and development consistent with County Tree Ordinance and General Plan policies.
- CO-135. In 15 years the native oak canopy within on-site mitigation areas shall be 50 percent canopy coverage for valley oak and 30 percent canopy coverage for blue oak and other native oaks.
- CO-136. If on-site mitigation is not possible given site limitation, off-site mitigation may be considered. Such a mitigation area must meet all of the following criteria to preserve, enhance, and maintain a natural woodland habitat in perpetuity, preferably by transfer of title to an appropriate public entity. Protected woodland habitat could be used as a suitable site for replacement tree plantings required by ordinances or other mitigations.
- a. Equal or greater in area to the total area that is included within a radius of 30 feet of the dripline of all trees to be removed;
 - b. Adjacent to protected stream corridor or other preserved natural areas;
 - c. Supports a significant number of native broadleaf trees; and
 - d. Offers good potential for continued regeneration of an integrated woodland community.

Implementation Measures:

- A. Through aerial photo interpretation and other means, survey county and identify existing mature, native, and landmark trees for protection. Develop an inventory of those trees to be protected. (Planning)
- B. Amend the County Tree Preservation Ordinance to include the protection of the native and landmark trees consistent with General Plan policies on lands zoned for urban and agriculture/residential use. (Planning, Public Works)

- C. Amend the County Tree Preservation Ordinance section 19.12.130 to include current agricultural standards and practices which include, but are not limited to measures to protect roots and root zones, pruning techniques, grading, soil compaction, and vegetative control. (Public Works)
- D. Amend the Tree Preservation Ordinance to accord the same protection now provided for native oaks to native trees, including northern California black walnut (Juglans hindsii) and California Sycamore (Platanus racemosa).
- E. Amend CEQA project review procedures to require exhibits identifying all tree species, tree locations, and tree diameters, at 4.5 feet above ground, for all projects. (Planning and Environmental Review and Assessment)
- F. Amend building permit requirements to require identification of trees on plans and review plans to ensure protection of trees. (Public Works, Building Inspection)
- G. Indicate on development plans existing native oak canopy, oak canopy to be preserved, and on-site mitigation area to replace lost canopy to ensure oak regeneration opportunities.

TREE COUNTY USA STATUS

Objective: A coordinated, funded urban trees plan and program sufficient to achieve "Tree County USA" status by 1995.

Intent: "Tree County U.S.A.", a designation granted by the National Arbor Day Foundation, recognizes communities that are effectively managing their tree resources. Criteria for "Tree County U.S.A." status are: establishing a tree ordinance, appointing a tree committee, assessing a minimum of \$2.00 per capita to support a tree program, and proclamation of Arbor Day. By working to achieve "Tree County U.S.A." status, a greater emphasis will be made to integrate trees into the urban environment. Benefits include a demonstrated commitment towards the urban forest, increased public awareness of trees and their importance, and increase sensitivity toward protecting the urban forest while planning new development.

Implementation Measures:

- A. Establish a task force to develop a Tree Master Plan which includes tree planting and maintenance policies, formation of a tree commission, and recommend action on financing measures to support a tree program. (Planning, Parks, Public Works, Administration and Finance Agency)
- B. Determine current funding support for tree programs, and if necessary, enact financing measures sufficient to generate a minimum of \$2.00 per capita per year to support an active, comprehensive, Community Tree Program. (Planning, Parks, Administration and Finance Agency)

- C. Proclaim Arbor Day and commemorate it by a public Tree Planting event.
(Parks)

NEW URBAN TREES

Objective: One million new trees planted within the urban area between now and 2000.

Intent: Sacramento County's urban forest is an integral element of its natural and urban landscape and contributes significantly to the quality of urban life. Trees offer many benefits to the community and its visitors, that include creating an aesthetically pleasing environment, increasing property value, and reducing noise. In addition, trees are known to combat the "urban heat island effect" by reflecting ten (10) to twenty-five (25) percent of the solar radiation that reaches the earth and dissipating much of the absorbed radiation through evaporation which reduces household energy requirements. Furthermore, trees can improve air quality by providing effective filtering of particulate matter and absorption of certain gaseous pollutants.

Currently private tree foundations are actively working to meet the 1,000,000 new tree objective. A complete tracking program to monitor progress is under development. SMUD is also developing a major tree planting program to increase shade around buildings. The County should actively support these and other efforts to increase trees in the unincorporated area.

The County, recognizing the advantages trees offer, has an established Tree Ordinance. However, county tree provisions presently require only 30% to 50% tree canopy coverage in parking lots, depending upon lot size, delineate narrow tree easement strips, and do not require tree planting in new residential areas. To maximize potential tree planting sites amendments to the Zoning Code and Tree Ordinance shall seek additional shade cover. Policies and programs below seek to expand the canopy by increasing shade coverage in most parking areas, enlarging tree easement in residential areas, and requiring tree planting or funding of planting by developers.

Policies:

- CO-137. Increase the number of trees planted within residential lots and within new and existing parking lots.
- CO-138. Support private foundations with local funds for their tree planting efforts.

Implementation Measures:

- A. In cooperation with local print media and nurseries, produce annual pre-Arbor Day newspaper supplement on the value of urban trees including coupons from local nurseries for discounts on tree purchases. (Parks, Public Works, and private tree foundations)

- B. Amend Public Works Department's tree planting specifications and installation requirements to better facilitate street and median trees on streets and throughways. (Public Works)
- C. Establish a 12.5' tree planting easement in new development and residential areas. (Planning)
- D. Prepare and adopt an ordinance requiring the planting a minimum of one 15 gallon street tree on each new residential lot and two 15 gal street trees on each new residential corner lot. Provide developers the option of planting trees or depositing monies into a tree planting fund equal to the cost of providing, planting, and initial irrigation of the trees and earmark proceeds toward tree planting in the same development. (Planning and Public Works)
- E. Amend Zoning Code commercial parking provisions to require, within 15 years, provisions to a minimum of 50% shade within any parking lot, a minimum 8' x 8' area for planting strips and landscape modifications to bring existing parking lots up to code standards for any development expansion or improvement exceeding 10 percent of the existing building's interior square footage. (Planning)
- F. Establish a recommended street tree list. (Public Works)

URBAN TREE MANAGEMENT

Objective: Urban tree management practices which promote trees as economic and environmental resources for the use, education, and enjoyment of current and future generations.

Intent: Community support, from public agencies, private organizations, and individuals form the foundation of a well balanced urban forestry program. Support for an urban forest program requires public education and outreach regarding the importance of trees in or near urban environs. To facilitate increased public awareness private organizations and public agencies should develop educational materials which inform the public on urban forest issues. In addition, local utilities, particularly SMUD, should be involved in the placement and planting of new trees to maximize energy conservation and air quality benefits provided by an urban forest.

Policies:

- CO-139. Provide funds for education, programs, and materials emphasizing the value and importance of trees.
- CO-140. Work cooperatively with local utilities to assure that new trees are planted in locations that will maximize energy conservation and air quality benefits.

Implementation Measures:

- A. Provide public awareness materials on the value of trees for property owners and for decreasing the "urban heat island effect". (Parks, Public Works, Agricultural Extension, and private tree foundations)
- B. Produce curriculum for school age children and other education materials to promote the preservation and historical importance of oak trees. (Parks, Public Works, Agricultural Extension, and private tree foundations)

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION V

VEGETATION AND WILDLIFE

E. RARE AND ENDANGERED SPECIES

GOAL: Increase population of threatened and endangered species found in Sacramento County.

INTRODUCTION

State and local biologists view most threatened (defined as likely to become endangered without special protection) and endangered (in danger of extinction) species populations as declining or stable, signaling a continuing degradation in the quality of the county's ecosystems. Expanding urban development and agricultural production are limiting successful habitat preservation and population gain efforts. In this document the term "special status" refers to threatened, endangered, and special status species.

The County's riparian environs along the Sacramento, American, and Cosumnes Rivers and other drainages provide some of the most important habitat areas for threatened and endangered species. One resident of the county's riparian area, the valley elderberry longhorn beetle which feeds only on blue elderberry, is in danger of extinction due to loss of habitat primarily from river channelization and levee stabilization. The threatened Swainson's hawk, another inhabitant of riparian areas, nests along the 32 mile stretch of the Sacramento River between Freeport up river to the county line. Fifteen nesting pairs have been observed along this stretch, the greatest concentration along the entire river. The Sacramento River system is also home to the endangered winter-run chinook salmon. This species, distinct from its fall and spring migrating cousins, dropped to only 600 individuals during the 1989 migration, compared to a presumed stable population of 2,000 during the last decade and the 60,000-120,000 spawners observed in the 1960s. Plant species, such as the California hibiscus and the Antioch Dunes evening primrose, are also severely threatened by riparian habitat destruction.

Wetland and vernal pool areas of the County provide habitat for a significant number of threatened and endangered species. The Beach/Stone Lakes area, currently being studied for National Wildlife Refuge status, is a vibrant habitat for many species in need of protection, including the giant garter snake, American white pelican, double-crested cormorant, northern harrier, and peregrine falcon. Vernal pool concentrations, found in the south central and southeastern section of the county sustain special and unique flora adapted to the ephemeral nature of these small unpretentious habitats. Several of the

approximate 200 species associated with vernal pools are candidates for protection. They include, dwarf downingea, Boggs lake hedgehyssop, slender orcutt grass, and bearded popcorn flower.

There is a need to focus upon habitat requirements, restoration needs, habitat preservation, and population revitalization. Although the responsibilities for enhancing species survival should remain with state and federal agencies where staffing and expertise are available, county efforts should include preserving suitable habitat, establishing threatened and endangered species management policies for public lands, and encouraging state and federally sponsored population recovery programs.

This section describes policies and programs under two objectives:

1. Riparian and wetland environments managed with sensitivity to threatened species.
2. Habitat suitable for threatened and endangered species identified, protected, interlinked with natural corridors, and where possible reestablished with viable population of special status species.

MANAGEMENT OF RARE AND ENDANGERED SPECIES HABITAT

Objective: Riparian and wetland environments managed with sensitivity to threatened species and maintained to the extent feasible in a manner that avoids conflicts with privately owned land and agricultural operations.

Intent: Riparian and wetland areas of the county provide habitat for a significant number of threatened and endangered species. Yet, activities which may be detrimental to threatened species, such as active recreation, levee protection measures, and development are allowed to continue without due consideration of habitat requirements for special status species. Greater emphasis on and a stronger commitment to reversing the decline of species needs to be a priority when considering development options potentially destructive to threatened and endangered species habitat. Wildlife preserves, native grassland propagation, riparian area protection, and natural area buffer zones should be given priority over recreation, ranching, channelization, and development expansion in areas known to or having the potential to contain threatened and endangered species.

Policies:

- CO-141. Manage vegetation on public lands with special status species to encourage native species and discourage nonindigenous invasive species.
- CO-142. Public land shall be maintained to the extent feasible in a manner that avoids conflicts with privately owned lands and agricultural operations.

- CO-143. Control human access to critical habitat areas on public lands to minimize impact upon and disturbance of threatened and endangered species.
- CO-144. Protect critical habitat areas on public lands from pesticide and other similar chemical residues.
- CO-145. The County shall work with the mosquito abatement district to ensure that mosquito control measures having the least effect on non-target species are implemented in preserved wetlands throughout the county.
- CO-146. The proximity of diverse habitat types shall be considered in identifying nondevelopment areas in Community Plans and in identifying potential or preferred natural preserves and mitigation banks.

Implementation Measures:

- A. Seek easements or agreements which would limit aerial pesticide spraying within 1/4 mile of critical habitat areas located on public lands and containing threatened and endangered species. (responsible open space/conservation agency)
- B. Determine critical habitat areas containing special status species and develop appropriate management. (Planning in conjunction with state and federal agencies)

PROTECTION OF RARE AND ENDANGERED SPECIES HABITAT

Objective: Habitat suitable for threatened and endangered species identified, protected, interlinked with natural corridors, and where possible, reestablished with viable population of special status species.

Intent: Significant loss of riparian and wetland habitats over the years is the principal reason for and continued threat to special status species. The habitat preservation policies and programs outlined elsewhere in this Element and the Open Space Element address the problem in the overall sense. Yet, as important as it is, habitat protection must not be the only focus of efforts to protect special status species. There remains the need to identify specific habitats which meet the specialized requirements of threatened and endangered species, survey possible habitats to locate additional populations, assess the potential for reintroduction of special status species, provide for interlinking habitats with natural corridors, and develop appropriated repopulation programs. Such intervention prior to significant further decline in population can increase propagation, ensure genetic diversity, and ultimately remove the need for protected status.

Proactive species management must necessarily be limited initially, but as resource management agencies expand their holdings additional steps can be undertaken.

Policies:

- CO-147. Identify suitable habitat for threatened and endangered species through the Community and Specific Plan process.
- CO-148. Habitat conservation plans shall be adopted by the county for any listed species that are year-round inhabitants of the county, are subject to significant cumulative impacts from development, and are not otherwise adequately protected by designated systems of riparian corridors, vernal pool and wetland preserves and mitigation banks, or other nature preserves or wildlife refuges.
- CO-149. Acquisition programs for acquiring open space located within natural areas shall, wherever possible, review the significance of obtaining areas known to contain threatened, endangered, and special status species.
- CO-150. To the extent feasible, plans for urban development and flood control projects shall incorporate habitat corridors connecting on-site or adjoining areas (if any) not designated for alteration.

Implementation Measures:

- A. Identify habitat suitable for rare and endangered species. (Planning, in conjunction with state and federal agencies)
- B. Prepare a biannual report to the Board of Supervisors on rare threatened, endangered, special status species populations within the County. (Planning).
- C. Coordinate with Department of Fish and Game in planning and developing programs to encourage species propagation. (Parks and Planning)
- D. Assist habitat management programs aimed at responding to declining populations of threatened and endangered species. (Planning and Parks, in conjunction with state and federal agencies)
- E. Monitor populations of threatened and endangered species with assistance of staff from the Department of Fish and Game's Natural Diversity Data Base office. (Planning and Parks, in conjunction with state agencies)

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION V

VEGETATION AND WILDLIFE

F. FISHERIES

GOAL: Fisheries in County waterways and water bodies preserved and protected.

INTRODUCTION

The drainages and water bodies within or passing through Sacramento County provide habitat for a diversity of fish, including both anadromous and resident species. Anadromous fish include chinook salmon, steelhead trout, striped bass, shad, sturgeon, and lamprey. Resident fish can be separated into warm water fish (such as bass, crappie, catfish, bullhead, sunfish, and carp), and cold water fish (such as rainbow and brown trout).

The most popular fish for sport and commercial catch are anadromous. Chinook salmon, economically the most important fishery in the county, are harvested in the fall, steelhead trout in winter, and shad in late spring. Fishing for resident species, although less important economically, attracts many fishing enthusiasts. Resident fish are also a major component in the predator-prey relationship with anadromous species and are vital in maintaining the ecological balance of County water ways.

Fisheries have declined with expanding development and habitat neglect. The loss has been generated by water diversion, habitat destruction, water temperature increases, and pollution. Spawning areas, such as gravel shoals for salmon and shade pools for warm water fish, have diminished. Both commercial and sport fishers are observing declines in population and reduced fishing success.

The State Department of Fish and Game has primary responsibility to maintain the county fisheries resources. However, to successfully reverse fisheries decline, the County, through its policies, should pursue programs that increase propagation, preserves and protects existing aquatic environments, and restore lost habitat.

This section describes policies and program under four objectives:

1. Water flows monitored and maintained, when climatic conditions allow, to promote fish propagation and migration.
2. Maintenance of channelized areas to reduce detritus accumulation and increase fish populations.

3. Water quality and runoff levels maintained to provide a healthy aquatic environment for fisheries.
4. Riparian vegetation and topographic diversity maintained by stream channel and bank stabilization projects.

WATER FLOWS

Objective: Water flows monitored and maintained, when climatic conditions allow, to promote fish propagation and migration.

Intent: Diversion of water and changes in discharge volume and timing have impacted habitat and reduced both anadromous and resident fisheries, especially in the Sacramento and American Rivers. For example, prior to Folsom Dam, peak discharge of the American River occurred during March, April, May, and June. Post Folsom Dam discharges peak during January, February, and March. Such changes in discharge levels impact sediment load, water temperature, migration patterns, gravel accumulations, and stream side vegetation to the detriment of fisheries. Diversion and obstruction of water from moderate and small streams for local flood control, agricultural water reservoirs, and stock ponds have also contributed to the decline of fisheries by destroying in stream and bank side vegetation, changing sediment loads, increasing runoff, and altering migratory routes.

The State Water Resources Control Board has basic responsibility for setting minimum flows in the American River for water quality purposes and to sustain fisheries. Sacramento County, through its policies, can support minimum flow requirements in the American River and other waterways under its authority. These policies are included in the section on water supply.

Policies:

- CO-151. Provide unobstructed water flows throughout the network of natural waterways by prohibiting blockage, tunneling, or obstruction of contiguous stream channels.
- CO-152. Protect and preserve migratory route for anadromous species.
- CO-153. Reduce mortality of migrating fish by requiring screens or similar bypass apparatus on diversion pumps.

Implementation Measures:

- A. Refer all projects adjacent to streams for review by the State Department of Fish and Game, if they have jurisdiction. Incorporate their recommendations as mitigation measures subject to project approval.
(Planning)

- B. Survey and map important fishery waters and channels. (Parks, in conjunction with flood control and water reclamation districts)
- C. Monitor state research on factors affecting anadromous fish migration in the Sacramento and American Rivers and report biannually to Board. (Planning)
- D. Require screening on all public water diversion facilities. Screen will meet State Department of Fish and Game screen design criteria standards. (Planning and Public Works)
- E. Seek enforcement of Section 5980-5993, 6020-6028, and 6100 of the State Department of Fish and Game Code which grants Fish and Game the authority to require screens on diversion pumps for fish protection and adequate bypass flows to make screens effective. (Planning)

CHANNELIZED AREAS

Objective: Maintenance of channelized areas to increase fish populations.

Intent: Warm water fisheries exist along many of the channelized drainages in the county. Limited spawning can occur in canals, but population levels are maintained primarily through fish passage. Many species do quite well in channelized areas provided the drainage is not used as a dumping ground. Unfortunately, many channelized areas have become a depository for household wastes. Such waste includes toxic substances, such as automobile batteries and household chemical compounds which severely reduce water quality necessary for healthy fisheries. Other such debris includes household trash, appliances, and tires which lessen habitat quality by disrupting water flow, collecting sediment, and destroying in stream and bank vegetation. Many channelized areas are no longer fished because dumping has ruined the natural character and severely reduced fisheries. To restore and expand the resource channelized areas must be protected through law enforcement measures and cleanup efforts.

For policy see Urban Stream Section.

WATER QUALITY

Objective: Water quality and runoff levels maintained to provide a healthy aquatic environment for fisheries.

Intent: New developments proximal to natural drainages have significantly changed water quality and runoff patterns. Water flowing over roofs, sidewalks, driveways, and streets collects oil, pesticide, and other chemical residues which are deposited into aquatic habitats. Reduction of natural catchment basins and permeable surface area has increased runoff and erosional processes causing stream bed and bank deterioration. To maintain fisheries and associated habitat, runoff should be periodically tested for toxicity and, if necessary, treated before release into natural drainage. To enhance

percolation processes and reduce destructive erosional forces permeable surface area should be maintained.

For policy see Surface Water Quality Section

BANK STABILIZATION

Objective: Riparian vegetation and topographic diversity maintained by stream channel and bank stabilization projects.

Intent: Reliance on channelizing to stabilize stream banks has impacted fisheries. Removal of natural in-stream and bank vegetation reduces, to the detriment of fisheries, topographic diversity in the natural drainages. Such impacts include reducing stream depth variation, increasing water temperatures, and decreasing flow variation. Measures to enhance fisheries, bank stabilization, and the riparian environment should include a vigorous planting schedule of large scale trees and stream side shrubs, as well as an examination of measures that enlarge flood water capacity without channelizing drainage. Such measures must, however, not compromise the ability of the 100-year floodway to safely convey flood water.

For policy see Urban Stream Section

SACRAMENTO COUNTY GENERAL PLAN CONSERVATION ELEMENT

SECTION V

VEGETATION AND WILDLIFE

G. RESOURCE CONSERVATION AREAS

GOAL: Public/Private cooperative efforts to conserve wildlife values, wetland features, and woodland.

INTRODUCTION

Agricultural and grazing lands harbor the majority of the County's various natural habitats, including marsh and riparian habitat, vernal pools, and valley and blue oak woodlands. These values have been maintained under stewardship of private farmland and ranch owners who have, in many cases, preserved habitat while pursuing agricultural production. Resident wildlife species utilize these areas for nesting, along with migratory birds, resident raptors, and many other terrestrial and avian species. Without these pockets of habitat, sustained populations of various wildlife species would be difficult to achieve or maintain.

This section describes policy and programs under one objective:

1. Broad-based voluntary participation by property owners to preserve or enhance natural values in conjunction with existing agricultural land uses.

VOLUNTARY PARTICIPATION

Objective: Broad-based voluntary participation by property owners to preserve or enhance natural values in conjunction with existing agricultural land uses.

Intent: Given the decline of all habitat types in Sacramento County and the importance of agricultural land in perpetuating the wildlife resource, voluntary cooperative efforts between private landowners and the County are an important part of this Element's strategies to conserve habitat concentrations of moderate to high value vernal pool, wetland, and oak woodland resources as shown on the Open Space Preservation Strategy Diagram and the Land Use Diagram. The areas, referred to as Resource Conservation Areas (RCA), attempt to illustrate where lands with suitable nest and foraging habitat occur. The RCA designation combines and overlays only with agricultural and natural preserve designations in suitable areas outside the Urban Service Boundary. These two underlying designations regulate appropriate use and zoning. The overlying RCA designation is a management tool, not regulatory, meant to broadly identify areas that potentially qualify for a cooperative and voluntary conservation agreement between the land owner and the County. Landowners who enter into cooperative agreements voluntarily commit to preserve or enhance habitat

values. The County will endeavor to make such agreements attractive for the land owner by providing incentives in the form of ecological assistance or materials compensation. It is recognized that not all land designated RCA contains appropriate values to participate in the program. As part of the implementation process, a map will be drafted identifying properties suitable for voluntary conservation programs.

Policy

CO-154. Voluntary cooperative agreements shall involve those lands within Resource Conservation Areas that contain moderate to high value habitat, exhibit likely habitat restoration potential, or provide foraging opportunities.

Implementation Measures:

- A. Evaluate Resource Conservation Areas to determine
 - 1) Areas with moderate to high quality habitat;
 - 2) Areas where special management practices could enhance natural vegetative cover, ie., blue oak woodlands; OR
 - 3) Areas which, by utilizing crop management methods, will provide foraging opportunities for resident or migratory wildlife species.
- B. Create cooperative habitat conservation programs by developing incentives which encourage voluntary participation by land owners to preserve or enhance wildlife habitat. Program incentives may include, but are not limited to, education and practical assistance, resource evaluation, and material compensation.

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VI

CULTURAL RESOURCES

GOAL: Promote the inventory, protection and interpretation of the cultural heritage of Sacramento County, including historical and archaeological settings, sites, buildings, features, artifacts and/or areas of ethnic historical, religious or socio-economical importance.

INTRODUCTION

The foundation of a cultural community rests upon the attributes and artifacts of its predecessors. Preserving and understanding these cultural resources needs to be an element of consideration when planning for future growth.

Sacramento County is fortunate to have a rich and varied collection of historic and prehistoric features which record significant, as well as routine, events in the county's long history of human habitation. Exemplary archaeological sites of Nisenan-Maidu and Plains Miwok Indians have been identified along river terraces. Their location are fiercely protected by researchers who feel, without protection, the sites would be disturbed if the locations were disclosed. The history of the county is seen in sites and structures which covers time from prehistory to our recent past. History represents a variety of ethnic and cultural groups and ranges broadly through social, economic, military and political subjects.

The artifacts left by our prehistoric predecessors include hand implements, middens rich in an array of discarded objects, isolated field houses, and mud, stone, and stick structural remains of entire villages. Trained and locally experienced archaeologists decipher the relationship these artifacts have to one another in hopes of understanding, among other things, food gathering practices, societal structuring, and trading networks.

The historic imprints of more recent settlers are found in a diminished number of sites and standing structures. The events that occurred on these sites or in these structures may have local significance, or the architectural style may lay claim to an era important to the county's past.

Preserving and stabilizing remnants of our past require that we address problems leading to the rapid deterioration of our cultural resources. Problems include inadequate data regarding site locations, insufficient monitoring of development proximal to sensitive areas, poor cultural resource training for County staff charged with construction monitoring, no consensus on what constitutes a significant site and what are appropriate mitigation measures, and the lack of a County cultural resource professional to coordinate

preservation efforts. Additional problems include insufficient funding to protect sites through public purchase, private conservancies, and easements; inadequate access limitations and regulation enforcement; and poor methods of preserving, cataloging, and storing artifacts. The County needs to demonstrate an organized and method driven commitment to preserving and protecting sites. The term site refers to sites, buildings, structures, and human alterations to the natural environment as well as the artifacts contained on or within a site. Preservation of such sites representing the county's rich and historic past ensures that future residents will have the opportunity to learn about the important contributions past inhabitants have had on the area's development. The need to establish policies protecting cultural resources is all the more urgent as unprecedented urbanization and population growth expands into the 21st century.

This section describes policies and programs under six objectives:

1. Attention and care during project review and construction to ensure that cultural resource sites, either previously known or discovered on the project site, are properly protected with sensitivity to Native American values.
2. Structures with architectural or historical importance preserved to maintain exterior design elements.
3. Known archaeological and historic sites protected from vandalism unauthorized excavation, or accidental destruction.
4. Comprehensive knowledge of archeologic and historic site locations.
5. Properly stored and classified artifacts for ongoing study.
6. Public awareness and appreciation of both visible and intangible historic and cultural resources.

ARCHEOLOGIC SITE PROTECTION DURING DEVELOPMENT

Objective: Attention and care during project review and construction to ensure that cultural resource sites, either previously known or discovered on the project site, are properly protected with sensitivity to cultural and ethnic values of all affected.

Intent: The intent of these policies is not to lessen the value or reemphasize the importance of CEQA to ensure that archaeological surveys and appropriate mitigation measures are instituted during project review. On the contrary, CEQA has proven, to varying degrees, to be an effective shield for preserving remnants of our cultural heritage. However, certain inadequacies exist in the ad hoc nature of CEQA implementation that can degrade local resources. To correct inadequacies at the local level an overall policy framework is necessary.

A consistent methodology utilizing local cultural resource agencies and county staff needs to be formulated to integrate mitigation measures and protection efforts into county development guidelines. Criteria for survey, protection, and mitigation methodologies should be developed through consensus by a committee of cultural resource professionals. Past inconsistent application of protection and mitigation measures have caused uncertainties among developers over calculating costs and scheduling construction. In turn, this has led to costly delays and, possibly, poorly thought out mitigation and protection measures. Questionable measures elsewhere in the state have incited Native Americans to strongly protest the disrespectful and improper destruction of their heritage and to seek regulations protecting remnants of their past. To avoid situations that inadequately protect the resource, confuse applicants, and antagonize concerned parties, the County must formulate, with the assistance of knowledgeable agencies, mitigation and protection measures that protect the resource from destruction and pertain to all development.

Policies:

- CO-155. Utilize the California Archeological and the Sacramento History and Science Division to assist in determining need for survey.
- CO-156. Refer projects with identified archeological and cultural resources to the Cultural Resources Committee to determine significance of resource and recommend appropriate means of protection and mitigation. The Committee shall coordinate with the Native American Heritage Commission in developing recommendations.
- CO-157. Significant archeologic, prehistoric, or historic sites shall be protected as open space for potential future excavation.
- CO-158. Native American burial sites encountered during preapproved survey or during construction shall, whenever possible, remain in situ. Excavation and reburial shall occur when in situ preservation is not possible or when the archeologic significance of the site merits excavation and recording procedure. On-site reinterment shall have priority. The project developer shall provide the burden of proof that off site reinterment is the only feasible alternative. Reinterment shall be the responsibility of local tribal representatives.
- CO-159. The cost of all excavation conducted prior to completion of the project shall be the responsibility of the project developer.
- CO-160. Monitor projects during construction to ensure crews follow proper reporting, safeguards, and procedures.
- CO-161. As a condition of approval of discretionary permits, a procedure shall be included to cover the potential discovery of archaeological resources during development or construction.

CO-162. As a condition of approval for discretionary projects which are in areas of cultural resource sensitivity, the following procedure shall be included to cover the potential discovery of archeological resource during development or construction:

Should any cultural resources, such as structural features, unusual amounts of bone or shell, artifacts, human remains, or architectural remains be encountered during any development activities, work shall be suspended and the Sacramento County Department of Environmental Review and Assessment shall be immediately notified. At that time, the Department of Environmental Review and Assessment will coordinate any necessary investigation of the site with appropriate specialists, as needed. The project proponent shall be required to implement any mitigation deemed necessary for the protection of the cultural resources. In addition, pursuant to Section 5097.98 of the State Public Resources Code and Section 7050.5 of the State Health and Safety Code, in the event of the discovery of human remains, all work is to stop and the County Coroner shall be immediately notified. If the remains are determined to be Native American, guidelines of the Native American Heritage Commission shall be adhered to in the treatment and disposition of the remains.

Implementation Measures:

- A. Report on recommended structure and representation of Cultural Resources Committee and appointment by Board. (Sacramento Commission of History and Science)
- B. Develop Committee procedures and criteria for preservation and mitigation. (Planning Department)
- C. Conduct periodic training programs for County Planning Staff, Public Works Inspectors, and County Parks and Water Resources maintenance personnel to facilitate their awareness of archeologic site indicators and proper procedures. (Planning).
- D. Existing implementation monitoring program to provide for on-site monitoring during construction adjacent to known sites. (Planning)
- E. Investigate the opportunity to develop a County Cultural resource ordinance in order to provide protection for archeological, historical, and cultural resources. (Planning)

HISTORIC STRUCTURE PRESERVATION

Objective: Structures such as buildings, bridges, or other permanent structures with architectural or historical importance preserved to maintain exterior design elements.

Intent: Too often, development destroys buildings that can identify a neighborhood or link the past to the present. This objective seeks to cement architectural importance and historical significance with design elements of future development. Such buildings or areas, when preserved, help to define community character. Sacramento County's noteworthy but limited array of historically significant structures, and diverse structural styles, lend themselves well to promoting development that recognizes the value of historic and archeological preservation.

Policies:

- CO-163. Conduct surveys and designate structures with architectural or historical importance on community plan maps. Where appropriate, plans shall designate significant historical architectural districts.
- CO-164. Develop local architectural preservation standards drawing from state and Federal guidelines.
- CO-165. Refer projects involving structures or within districts having historical or architectural importance to the Cultural Resources Committee to recommend appropriate means of protection and mitigation.
- CO-166. Development surrounding areas of historic significance shall have compatible design in order to protect and enhance the historic quality of the areas.

Implementation Measures:

- A. Develop design guidelines for areas adjacent to or within historic sites. (Sacramento Commission of History and Science)
- B. Promote the use of the State Historic Building Code to protect historic resources. (Public Works, Sacramento Commission of History and Science)
- C. Encourage owners of eligible historic properties to apply for State and federal registration and to participate in tax incentive programs for historic restoration. (Sacramento Commission of History and Science)
- D. Identify funding mechanisms to support programs to preserve, restore, and enhance unique historic sites. (Planning Department)
- E. Acquire and preserve sites, and/or acquire easements over sites and building facades. (County Parks, Sacramento History and Science Division)

DESTRUCTION OF CULTURAL RESOURCE SITES

Objective: Protect any known cultural resources from vandalism, unauthorized excavation, or accidental destruction.

Intent: This objective seeks is to prevent wanton or accidental destruction of archeological sites and, when desirable, to preserve artifacts in situ. The science of archeology attempts to understand and interpret human behavior and cultural traits through reconstruction of prehistoric and historic sites. Disturbance of sites and illegal removal of artifacts compromise a site's integrity and severely limit the interpretation of cultural attributes, especially within the historical context of the area. Protection of archeological sites is provided under state and local law, but local patrol and enforcement is vital. Contrary to popular belief, federal legislation such as the federal Antiquities Act does not protect archeological, historic, or cultural resources except on federal land. Protection of resources on other public or private land is dependent largely upon state and local legislation.

Policies:

- CO-167. Restrict the circulation of cultural resource locational information to prevent potential site vandalism. This information is exempt from the "Freedom of Information Act".
- CO 168. Cooperate with other agencies to enforce laws and aggressively prosecute illegal collection of artifacts.
- CO-169. Design and implement interpretive programs about known archeological or historical sites on public lands or in public facilities. Interpretation near or upon known sites should be undertaken only when adequate security is available to protect the site and its resources.

Implementation Measures:

- A. Develop plan in conjunction with Archeological Conservancy to secure easements, agreements, or other appropriate mechanisms to protect known cultural sites from disturbance or erosion. (Planning)
- B. Conduct periodic aerial overflights and conduct aerial photo analysis of archeologic site corridors to identify disturbance or illegal excavation. (Sheriff and Planning)
- C. Periodic patrol of publicly owned archeologic sites by park rangers. (Parks)
- D. Implement a program within County departments which manage or patrol properties with known cultural resources to facilitate their awareness of archaeological site indicators and proper procedures in handling cultural resources. (Planning)

CULTURAL RESOURCE SURVEYS

Objective: Comprehensive knowledge of archeologic and historic site locations.

Intent: A survey and inventory cataloging historic structures, old farmsteads, and recorded Native American sites would assist the county in protecting areas of cultural significance while planning for development. The Sacramento Museum and History Center tried unsuccessfully in 1989 to obtain grant monies from the State Office of Historic Preservation to initiate a survey of the entire County. This effort should continue.

Implementation Measures:

- A. Comprehensive survey to record location of archeologic and historic sites. Study design. Conduct survey. (Planning, Sacramento Commission of History and Science)
- B. Comprehensive survey to identify historically and architecturally important structures. Criteria and study design conduct surveys in conjunction with community plan updates. (Planning and Sacramento History and Science Division)

ARTIFACT STUDY AND STORAGE

Objective: Properly stored and classified artifacts for ongoing study.

Intent: Existing facilities for artifact storage are insufficient. Because of this, local universities and museums are no longer accepting new artifacts for their anthropology collections. Materials collected for scientific research during project mitigation are now being stored uncataloged in unspecified locations. Yet, mitigation measures undertaken during redevelopment to satisfy CEQA provision continue to yield an even increasing inventory of artifacts. There is a demonstrated and critical need to establish a storage facility. Funding for such a facility should be provided from developer mitigation fees and agreements should be reached with local postsecondary educational institutions to preserve and protect remnants of past cultures.

Implementation Measures:

- A. Initiate discussions regarding the preparation of a comprehensive regional study design for the excavation, cataloging and analysis of cultural resource artifacts and the synthesis of available information. (Planning)
- B. Identify the Sacramento History and Science Division as the County repository for cataloging and storage of the County's historical collection including excavated cultural artifacts. (Sacramento History and Science Division)

PUBLIC AWARENESS OF CULTURAL RESOURCES

Objective: Increase public education, awareness and appreciation of both visible and intangible cultural resources.

Intent: If preservation efforts are to be successful, the County will need to make a unified effort to protect critical sites as public parks and to educate residents on the value of preserving remnants of our collective past. A park highlighting the county's ethnic diversity is under development. Park planning efforts should expand further to preserve and interpret significant archeologic sites. For example, such an opportunity exists at Indian Stone Corral, a Native American village site that is worthy of park designation and is suited for interpretive facilities and educational activities. Providing on-site interpretive and education outreach programs to adult visitors and school age children is a sound conduit for instilling appreciation for and preservation of cultural resources. The County will continue to support the exhibits, public education programs and curation facilities of the Sacramento History Museum and Sacramento Science Center and continue to support the expansion of collections on local history and archaeology housed by the County/City library system and the History and Science Division at the Sacramento Archives and Museum Collection Center.

Policies:

- CO-170. Provide historic and cultural interpretive displays, trails, programs, living history presentations, and public access to the preserved artifacts recovered from excavations.
- CO-171. Interpretive elements involving Native American cultural resources shall be located at village sites (provided any unexcavated resources are properly protected) representative of different physical environments found in the County.

Implementation Measures:

- A. Prepare historical resource plans for incorporation into the recreational element of this plan. (Parks, Sacramento History and Science Division)
- B. Present educational programs to school age children. (Parks, Sacramento History and Science Division)
- C. Design educational criteria guidelines and study units for incorporation in county school curricula. (Parks, Sacramento History and Science Division, County Office of Education)

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

Section VII

A. WATER RESOURCES
BACKGROUND REPORT

1. WATER PURVEYORS

There are currently twenty-eight water purveyors in Sacramento County (see Table 1). There are five different categories of water purveyor: Dependent water districts, Autonomous (independent) water districts, Cities, Private, and Mutual water companies.

Table 1
WATER PURVEYORS IN SACRAMENTO COUNTY

Arcade WD	Mather AFB
Arden Cordova Water Service	McClellan AFB
Carmichael ID	Natomas CWD
Citizens Utilities	Northridge WD
Citrus Heights ID	Orochumne-Hartnell WD
Clay WD	Orangevale Mutual Water Co.
Del Paso Heights WD	Rancho Murieta Services District
Elk Grove Water Works	Rio Linda WD
Fair Oaks WD	Sacramento, City of
Florin County WD	Sacramento County WD
Folsom, City of	Sacramento County WMD
Fruitridge Vista Water Co.	San Juan Suburban WD
Galt, City of	SMUD
Galt ID	Tokay Park Water Co.

Types of Water Agencies

Dependent Water Districts: Dependent water districts are dependent on the county government for their power to implement water use plans.

Water Maintenance Districts: The Sacramento County Water Maintenance District is operated by the Department of Public Works. Several small districts were consolidated for the express purpose of constructing and maintaining a water distribution system within limited geopolitical jurisdictions. Included within the County operated water district are the following service areas: Valley Hi Greens, Arden Park Vista, Southwest Tract, Northgate 880, Sunrise, Hood, Grantline 99, Laguna, and Vineyard.

Maintenance districts may be formed for a number of purposes in addition to the operation and maintenance of a water distribution system. Some of the other common maintenance districts include both sanitary sewer and street lighting maintenance districts.

Autonomous Water Districts: There are four main types of autonomous water districts in Sacramento County: County water district, irrigation districts, California water districts, and community service districts. They are autonomous because each has its own independently elected governing body.

County Water Districts: Despite the name, all five "county water districts" are completely autonomous with elected governing bodies. Five county water districts were formed pursuant to the California Water District Act (Water Code Section 30000 et. seq.). The five are Northridge, Arcade, Florin County, Del Paso Manor County, and Rio Linda Water Districts.

Irrigation Districts: There are four irrigation districts located partially or wholly in Sacramento County. They include: Carmichael and Fair Oaks Water Districts and Citrus Heights and Galt Irrigation Districts. They were formed under the California Irrigation District Act (Section 20500 et seq. of the Water Code).

California Water Districts: There are two water districts in Sacramento County that were formed under the provisions of the California Water District Act (Water Code Section 35300 et seq.): They are the Clay and Omochumne-Hartnell Water Districts located in the southeastern section of Sacramento County.

Community Services Districts: The San Juan Suburban Community Services District provides retail and wholesale water to the northeast section of Sacramento County. Rancho Murieta Community Services District provides its own water system.

Cities: The following cities provide their own water service: City of Galt, City of Folsom, and City of Sacramento.

Private Water Companies: There are four private water companies in Sacramento County which are regulated by the Public Utilities Commission. They include: Arden-Cordova Water Service, Citizens Utilities Company of California, Elk Grove Water Works, and Fruitridge Vista Water Company. These purveyors are owned by stockholders and are governed by State Statutes set forth in the Public Utilities Code.

Mutual Water Companies: There are four mutual companies in Sacramento County. These entities are not regulated by any governmental body, except that when a mutual water company is formed and it sells "securities," or shares of the water system to its users, it must be granted permission to do so by the State Department of Corporations. If a mutual water company is a corporation (some of the smaller mutuals are not incorporated), it also files with the Office of the Secretary of State, like any other corporation. The mutual water companies

in Sacramento County are: Tokay Park, Orangevale, and Natomas Mutual Water Companies.

Water districts are responsible for securing and developing their own water supply either through obtaining surface water rights from the United States Bureau of Reclamation or drilling wells into any aquifers which may underlie their jurisdiction. The boundaries of each district are shown on the map, Figure 3. This can be compared to the study areas which were drawn up for the Sacramento County Water Agency Water Plan Supplement done by the Boyle Engineering Corporation as seen in Figure 4.

Sacramento County Water Agency (SCWA): This Agency was formed through the Sacramento County Water Agency Act. Its purpose is to develop an overall statement on county water needs.

The SCWA has the following responsibilities:

1. To provide a program of groundwater management with the objective of halting and, if feasible, reversing the long-term decline in groundwater levels, and terminating the use of groundwater of undesirable quality in the urbanized area of Sacramento County.
2. To establish appropriate groundwater management zones which may include areas within as well as outside the City Limits and to levy and collect groundwater charges within such zones for the purpose of managing groundwater use and improving groundwater quantity and quality. The revenues from the groundwater management program are used to offset groundwater management costs incurred by the County Water Agency and to pay for the construction of surface water facilities provided by the City.
3. To establish surface water benefit zones outside the City limits which will be benefited by surface water supply provided by the City. The Agency can assess, collect and pay to the City appropriate amounts for the construction of the surface water facilities provided by the City.
4. The County and the County Water Agency shall share and guarantee any debt financing required for the expansion of existing or construction of new facilities by the City.
5. The County shall cooperate in providing members of a technical advisory committee to represent the County and County Water Agency in providing specific policy and action recommendations and guidance to achieve the objectives of the Memorandum of Understanding (see separate section on Memorandum of Understanding for explanation of this term).

A Technical Advisory Committee drafts agreements delineating the County's participation in the expansion of the American River Water Treatment Plant and the City's commitment in treating and wheeling water obtained by the County to areas outside the City's place of use.

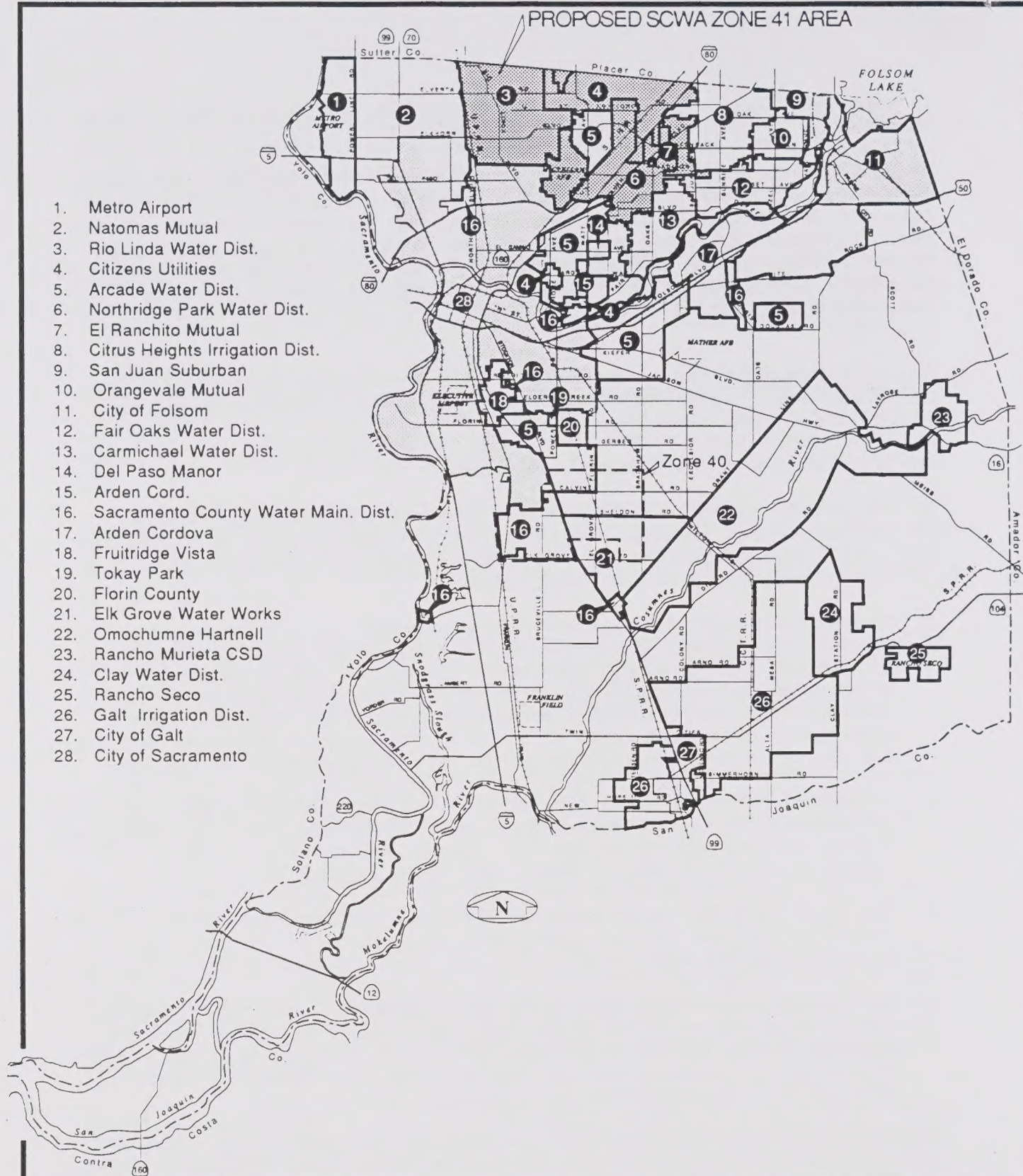


Figure 3

Water Districts

Prepared by the Sacramento County Planning and Community Development Department

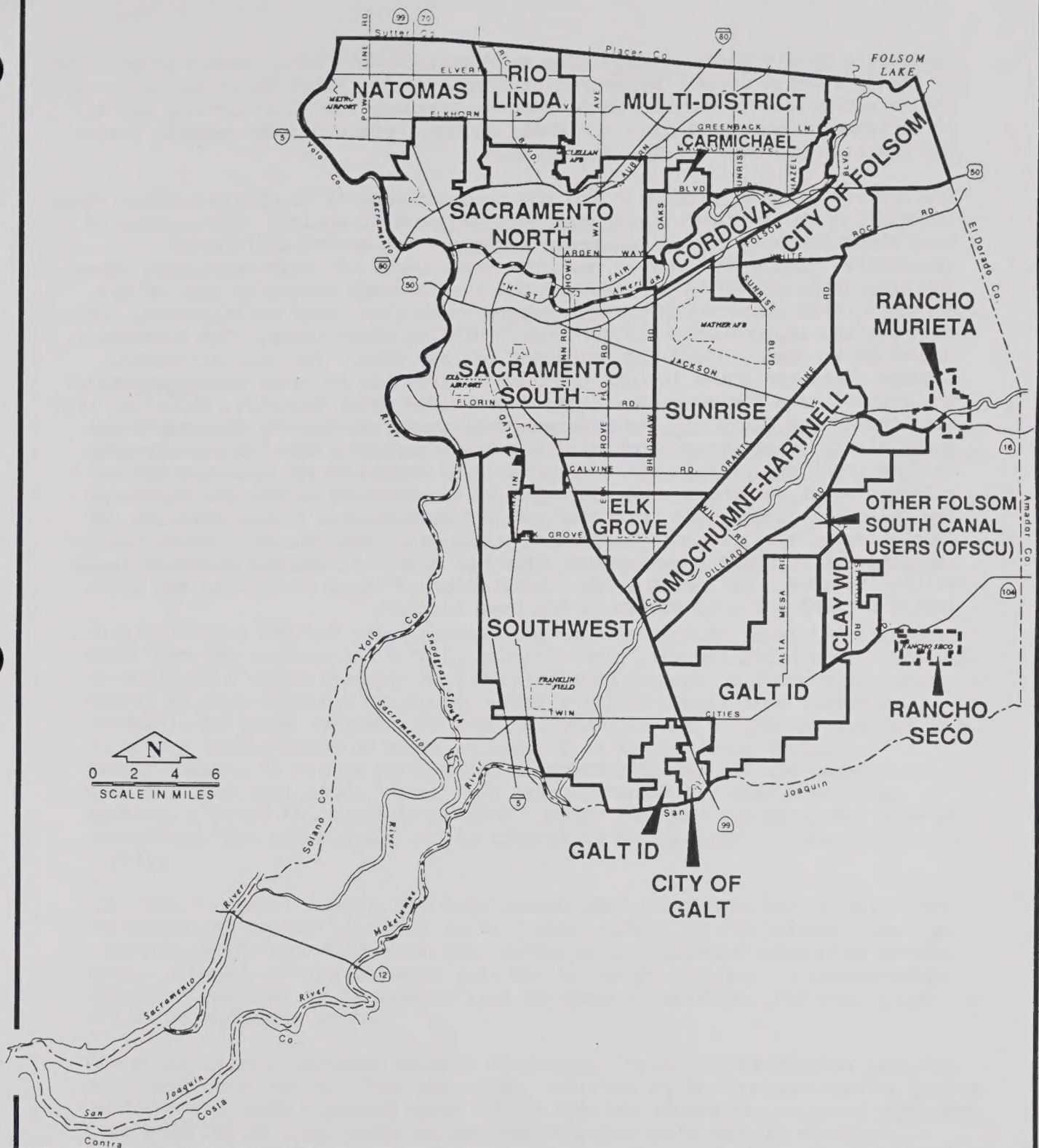


Figure 4
Sacramento Water Plan
Subarea Map

Prepared by the Sacramento County Planning and Community Development Department

Sacramento County Water Agency: The Sacramento County water agency is operated by the Sacramento County Department of Public Works, Water Resources Division, and is authorized to perform water supply, drainage and flood control for all of Sacramento County. Within the Water Agency, separate zones provide funds for specific projects in specific areas.

The current efforts of zone 40 and the proposed zone 41 to obtain surface water rights from the American River have received much attention. The purpose of both these zones is to try to secure surface water and/or additional groundwater rights in order to meet the water needs of their respective areas. The area to be served by zone 41 and the area already served by zone 40 are unincorporated areas which presently have no surface water entitlements. Both fund capital improvements through fees levied on water users. The Sacramento County Water Agency (SCWA) is empowered to levy fees. The main difference between these two zones is that the zone 40 area has no water purveyors while the zone 41 area has four purveyors: Northridge Water District, McClellan AFB, Rio Linda Water District, and Citizens Utilities Company. By joining, these water districts are more capable of negotiating water rights from a stronger unified position. Finalization of zone 41 is dependent on agreement by the affected water purveyors with the terms of the SCWA for formation of zone 41. The following issues must be worked out and agreed upon: administration and boundaries of the zone, procurement of water entitlements, and construction of facilities to provide a continuous supply of ground or surface water to lands within the zone. No fees for the construction of these facilities may be levied by SCWA until an agreement has been reached.

SACRAMENTO COUNTY PLAN
CONSERVATION ELEMENT

SECTION VII

A. WATER RESOURCES
BACKGROUND REPORT

2. CURRENT SUPPLY

Groundwater

Groundwater is subsurface water occurring in the zone of saturation (below the water table) and moving under the control of the water table slope or gradient. Below the ground surface there are two zones: an unsaturated zone and a saturated zone. The unsaturated zone is that zone between the land surface and the water table and includes the capillary fringe. Perched water bodies may exist within the unsaturated zone. The saturated zone is that part of the water-bearing material in which all voids, large and small, are filled with water.

Precipitation, applied water irrigation, and stream flow enter the unsaturated zone from the surface and flow by gravity toward the saturated zone. The rate at which this water reaches the saturated zone depends on factors including the amount of precipitation or applied water available, soil type (sandy or hardpan), moisture content, and vertical permeability of the unsaturated zone. If only a small amount of water is applied or is available through precipitation, it may be consumed by evapotranspiration of the vegetative growth in the soil zone. Water that passes through the soil zone moves downward through the unsaturated zone. Water reaching the saturated zone is considered deep percolation and is treated as an increment to the groundwater supply.

The time of travel through the unsaturated zone is unknown due to soil type variation and varying distance to the water table. In the Natomas area the response of the water table to precipitation or irrigation should be several days. However, in the southern part of the county it would be considerably longer. Generally it is assumed that recharge water takes less than a year to travel to the water table.

The water-bearing sequence beneath Sacramento County can be divided into two main saturation zones. The lower zone, referred to as the deep aquifer system, includes the black volcanic sands of the Mehrten Formation, volcanic sediments in the Valley Springs Formation and non-volcanic sediments in the Ione Formation. The upper zone, referred to as the shallow aquifer system, includes the non-volcanic sediments of the Fair Oaks, Laguna, and Victor formations, as well as the overlying alluvial deposits. Most significant water-yielding

deposits occur as sinuous layers of sand and gravel formed as stream channel deposits become buried as rivers and streams altered their course during geologic events (Figure 5).

Groundwater is the primary source of water supply for domestic, municipal and agriculture uses in the County. In 1987, it was estimated that groundwater use was approximately 450,000 AF/yr., accounting for 60 percent of the total water required by the county.

The average elevation of groundwater levels in Sacramento County remained steady at approximately 30 feet above sea level from 1930 through 1940. From 1941 to 1970, levels declined to about 50 feet below sea level. The declining trend has continued until 1981. The high precipitation experienced in 1982 and 1983 caused the groundwater level to temporarily rise. However, levels have gone into decline again and are now lower than in 1981. For more on this, see the section titled Groundwater Overdraft.

Recharge Characteristics

Only a relatively small portion of the land area of Sacramento County is underlain by materials with sufficient infiltration capability to provide natural recharge to the groundwater body. In the eastern foothill region, slopes are too steep and consequently precipitation in excess of evapotranspiration becomes runoff. The Victor plain and Delta area are underlain by soils containing hardpan or organic clays; the low permeability of these materials inhibits infiltration. It is only along active stream channels that sands and gravels occur of sufficient areal extent and depth that adequate quantities of surface water may infiltrate to recharge the ground water body.

Most of the stream channel deposits in Sacramento County occur along the courses of the Cosumnes and American Rivers. Along the former, studies have shown that there is an annual recharge of 17,000 AF/yr. along the river reach from Bridgehouse (east edge of the groundwater basin) to McConnell. Downstream from McConnell, recharge is insignificant due to an abundance of clay materials in the subsurface.

Recharge

Recharge to the groundwater basin is derived from three major components: precipitation, applied water, and streamflow.

- Precipitation is the general term for all forms of moisture emanating from the clouds and falling to the ground. In Sacramento County precipitation usually occurs as rainfall. Once the rain hits the ground, it can evaporate, become streamflow, or groundwater.
- Applied water is a general term for all forms of water applied by humans to irrigate crops. In general, about 65 percent of all irrigation water is consumptively used by plants for vegetative growth. Of the 35 percent left, 10 to 25 percent infiltrates the groundwater basin and the rest evaporates or becomes streamflow.

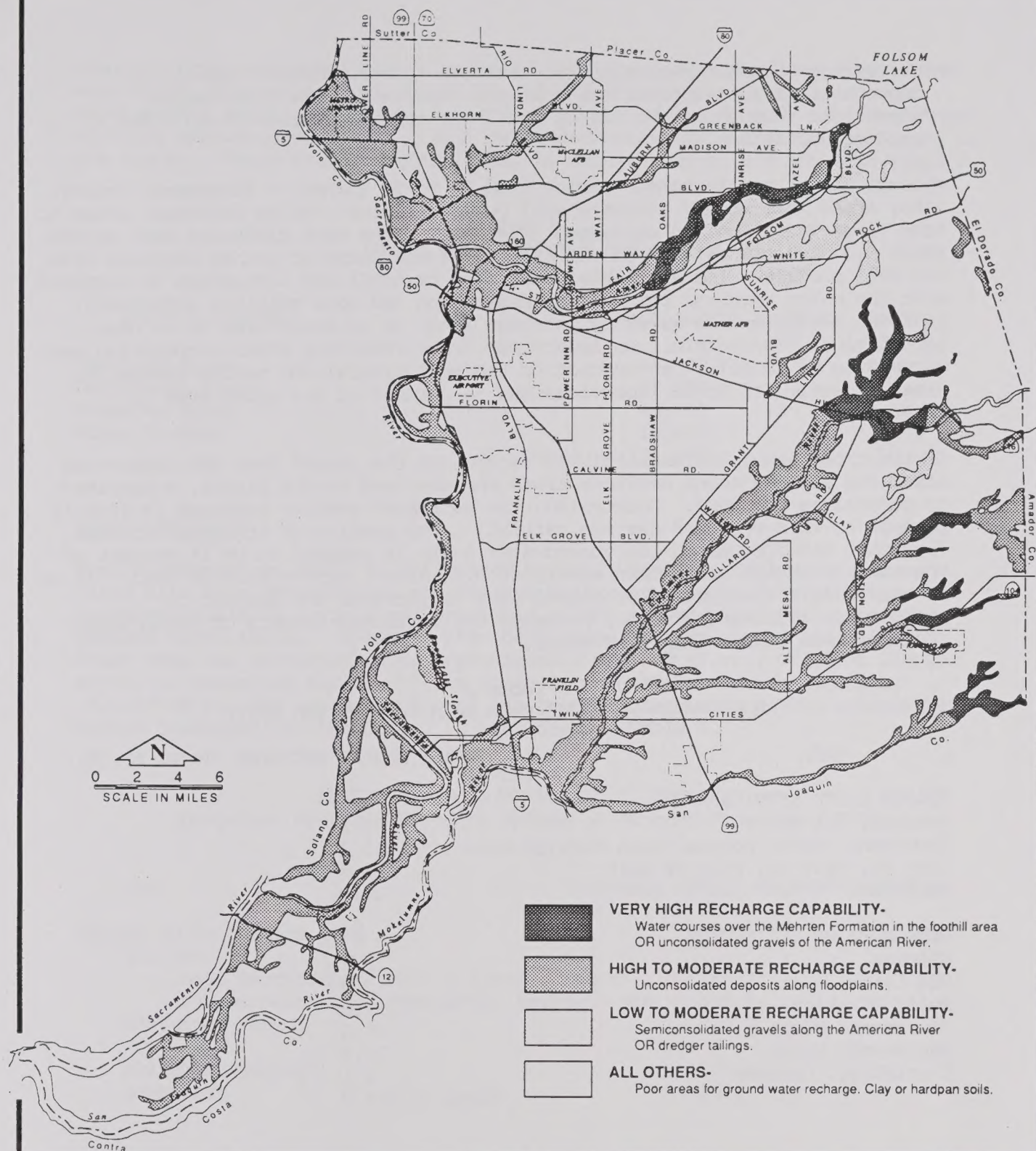


Figure 5

Groundwater Recharge Capability

Prepared by the Sacramento County Planning and Community Development Department



- Streamflow should, theoretically, recharge the groundwater body if no impervious surface impedes the downward flow, since the groundwater elevations throughout the County are lower than the stream's and river's surface elevations.

Average annual precipitation varies from 15 to 26 inches in Sacramento County. Also, areas have widely variable soil permeabilities causing different areas to have large variations in recharge. Different crops have different root depths which are directly related to the ability of the plant to gather moisture from the soil profile. The available water from rainfall and irrigation is compared with the water required for evapotranspiration and soil moisture deficiency. If there is any excess water on pervious land, it is considered to be deep percolation. The rainfall on impervious areas remaining after evaporation was assumed to be runoff. Ten percent of the agricultural and native vegetation areas is estimated to be impervious and 50 percent of the urban area is impervious.

In the urban area, approximately 20 percent of the runoff from the impervious areas ran onto adjacent pervious areas and was used by the plants, evaporated, or percolates downward. Countywide, the estimated average recharge is from 10 percent to 20 percent of average rainfall. The portion of irrigation return flow that contributes to the groundwater basin is assumed to be 15 percent of the annual average irrigation water, or 0.44 AF/yr. per an acre of land. It is assumed that 40 percent of urbanized area is pervious and subject to groundwater recharge. Table 2 presents the estimated amounts of groundwater recharge from rain and applied water.

Table 2
GROUNDWATER RECHARGE FROM RAIN AND APPLIED WATER

AREA	AVERAGE ANNUAL RECHARGE (Total AF/YR.)
FOLSOM SOUTH SERVICE AREA	
Sunrise, Elk Grove	21.9
Orochumne, Other Folsom South Service Area	19.7
Clay WD, Galt ID, City of Galt	16.9
Southwest	21.3
REMAINDER OF THE COUNTY	
Natomas	9.7
Rio Linda	3.3
Multi-District	12.6
Sacramento North	15.5
Sacramento South	15.2
Carmichael, Cordova	4.1
Total =	140.2

Other significant inflows into the groundwater basin under Sacramento County include streamflow recharge and subsurface inflows. These quantities are extremely difficult to estimate separately due to the lack of appropriate data.

However, it is estimated that a combined quantity for streamflow recharge and subsurface recharge inflows should be 135,300 AF/yr. for the Folsom South Service Area and 81,600 AF/yr. for the remainder of the County. The Department of Water Resources (Bulletin 118-3) presented estimated streamflow recharges in the County. These recharge quantities, by stream source, are shown in Table 3.

Table 3
ANNUAL RECHARGE FROM STREAMS

RIVER OR STREAM	AVERAGE ANNUAL RECHARGE (AF/YR)
American River	40,900
Sacramento River	23,800
Cosumnes River	43,900
Minor Streams	12,900
Total =	121,500

Sustained Yield

When a groundwater basin is influenced by any subsurface inflow, sustained yield will vary depending on the desired water level to be maintained. Sustained yield is defined as that yield of groundwater that will maintain present water levels. Based on this definition, the sustained yield for the Study Area was estimated to be approximately 357,000 AF/yr., of which 215,000 AF/yr. is estimated for the Folsom South Service Area, and the remaining 142,000 AF/yr. for the remainder of the County. A summary of the groundwater budget developed for the County is presented in Table 4.

Table 4
ANNUAL GROUNDWATER BUDGET (1,000 AF)
(Long-Term Average, Based on Review of Records From 1961-1981)

AREA	AVERAGE ANNUAL RECHARGE (AF/YR)
Folsom South Service Area	
Inflows:	
Deep Percolation (Rain & Applied Water)	79.7
Stream Recharge & Subsurface inflow - net	135.3
Sustained Yield	215.0
Outflows (pumpage)	235.2
Overdraft	20.2

AREA

AVERAGE ANNUAL RECHARGE

Remainder of the County

Inflows:

Deep Percolation (Rain & Applied Water)	60.4
---	------

Stream Recharge & Subsurface Inflow - Net	81.6
---	------

Sustained Yield	142.0
------------------------	--------------

Outflows (pumpage)	144.8
--------------------	-------

Overdraft	2.8
------------------	------------

Sustained Yield Subarea

Sustained yield estimates were calculated for each subarea so that surface water needs could be determined on a subarea basis. The estimates for each subarea are based on the ratio of each subarea to the total area. The results are calculated values and refinement will require further study of each local situation. These values are shown in Table 5.

Table 5
SUBAREA SUSTAINED YIELD ESTIMATES

SUBAREA	ESTIMATED SUSTAINED YIELD (AF/YR)
Folsom South Service Area	
Clay ID	7.5
Elk Grove	10.3
Galt, City of	3.6
Galt ID	33.4
Orochumne	33.9
Other Folsom South Service Areas	18.5
Southwest	56.9
Remainder of Study Area	
Carmichael	4.0
Cordova	6.6
Folsom, City of	0.0
Multi-District	30.9
Natomas	16.5
Rio Linda	8.9
Sacramento North	33.2
Sacramento South	41.9
Total =	357.0

Surface Water

There are no countywide surface water entitlements which would allow surface water to be distributed to all places which need surface water to augment their groundwater supplies. Surface water entitlements are restricted to "places of use" as follows (Table 6).

Sacramento River

Sacramento City: The City of Sacramento has water rights to 81,800 AF/yr. from the Sacramento River. Water from the Sacramento River can only be used to serve property within Sacramento City Limits. This is a legal requirement which cannot be altered by negotiations. But, as territory is annexed to the City it is entitled to Sacramento River water.

Natomas Central Mutual Water Company: The Natomas Central Mutual Water Company has entitlements to 82,000 AF/yr of Sacramento River water for irrigation purposes.

American River

Sacramento City: Currently, the City of Sacramento has water rights to approximately 245,000 AF of water per year from the American River; however, this is the diversion limit for the year 2030. The annual limit is based on an increasing schedule which began in 1963. About 57,000 AF/yr. is currently withdrawn from the river at the City's "H" Street diversion and treatment plant. Water from the American River can be delivered beyond the City Limits as long as it is within the boundaries of the American River Place of Use (POU) (Figure 6). To date, the City of Sacramento has contracted to sell or distribute American River Water only to Arcade Water District and Del Paso County Water District located within the American River Place of Use Boundary.

Cosumnes River

Rancho Murieta Water District: The Cosumnes River is the sole source of water for the Rancho Murieta community. The principal domestic water right held by the District is Application 2341b, Permit 16762. This water right allows for diversions from the Cosumnes River from November 1 through May 31 under the following conditions:

- A. No water can be diverted when river flows are less than 70 cubic feet per second (cfs) at Michigan Bar and there is evidence of visible flow at McConnell Gage located approximately 21 miles downstream. For flows between 70 cfs and 175 cfs, a maximum diversion of 6 cfs is allowed provided this diversion does not reduce the downstream flow below 70 cfs.
- B. When river flows exceed 175 cfs, a diversion of 6 cfs is allowed for direct use plus an additional 3,900 AF to storage is allowed as follows:
 1. 1,250 AF to Chesbro Reservoir

Table 6
ENTITLEMENT AND USE OF SURFACE WATER (AF/YR)

<u>Area</u>	<u>American</u>	<u>River Sacramento</u>	<u>Cosumnes</u>	<u>Total Current Estimated</u>	<u>Use</u>	<u>Total Water Available</u>
Arcade WD	3,363			2,130		1,233
Arden/Cordova	10,000			2,040		7,960
Carmichael	36,500			10,800		25,700
Citizens Utility						
Citrus Hts. 19774				19,640		134
Clay WD				4,190		
Del Paso County						
Elk Grove WW						
Fair Oaks WD 16,219				15,400		819
Florin County						
Folsom City 36,000				14,780		22,780
Folsom Prison 4,000				1,490		2,410
Fruitridge Vista Water Company						
Galt ID 90,00				7,340		82,660
Galt City						
Mather AFB 10,000						
McClellan AFB						
Metro Airport Included in Natomas						
Natomas CWD 132,000				82,000		60,000
Northridge						
Orochumne			2,000	10,400		-8,400
Orangevale				5,500		
Rio Linda						
Sacramento C. 90,200 currently 81,800				94,100		77,900
245,000 (by 2030)						
SCWD 60,000				2,000		58,000
SCWMD						
San Jaun 44,200				4,000		4,200
SMUD 60,000				9,418		50,582
Tokay Park						
Sunrise						
Other Folsom South						
Southwest						
Rancho Murieta			6,368	4,164		2,204
				Total = 289,392		388,182

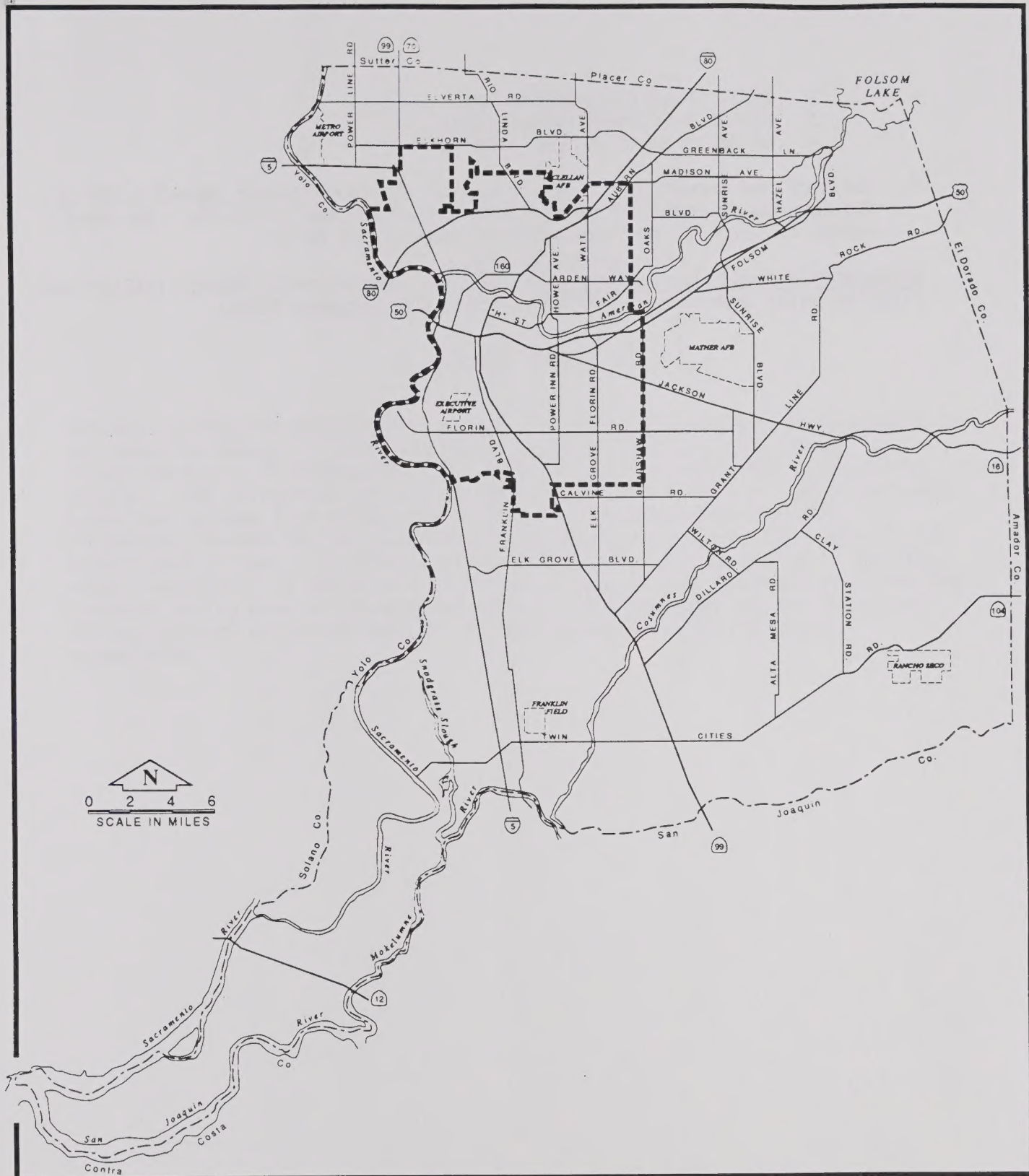


Figure 6

American River Place of Use Boundary Map

Prepared by the Sacramento County Planning and Community Development Department



2. 2,610 AF to Calero Reservoir
3. 850 AF to Clementia Reservoir
4. 40 AF to South Course Lake #10

C. The combined amount of B. (2), (3), and (4) above cannot exceed 2,650 AF. The maximum allowable rate of diversion to storage is 46 cfs. The total amount of water to be taken cannot exceed 6,368 AF/yr.

Omochumne-Hartnell Water District: The Omochumne-Hartnell Water District has riparian water rights to 2,400 AF/yr. from the Cosumnes River.

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VII

A. WATER RESOURCES
BACKGROUND REPORT

3. CURRENT WATER USE

Current surface and groundwater use for the different Subareas of Sacramento are shown in Table 7. There are three separate water use categories: 1) Agricultural, 2) Commercial and Industrial, and 3) Residential, Parks and Schools. All categories are not necessarily represented in all subareas; some areas having more land in agricultural use while others are strictly commercial, industrial and residential and still other areas are a mix of all three types of uses. In general areas which are mostly agricultural use more water, especially if there is a large percentage of rice lands as rice requires flooding during most of its growing season. However, much of the water used for agriculture either returns to the Sacramento River or recharges groundwater.

Table 7

CURRENT (1987) SURFACE AND GROUNDWATER USE IN THE COUNTY

<u>SUPAREA</u>	<u>SURFACE WATER AF/YR</u>	<u>GROUNDWATER AF/YR</u>	<u>TOTAL</u>
Carmichael Carmichael ID	10800	4300	15100
Cordova Eastern portion of the Arden Cordova Water District.	2040	10860	12900
Folsom, City of Aerojet, Folsom, & Folsom Prison.	16270	---	16270
Multi-District San Jaun Suburban WD, Citrus Heights ID, Fair Oaks WD, Lincoln Oaks area of Citizens Utility Co., Northridge WD, Orangevale Mutual WC, northern part of Arcade WD, and McClellan AFB.	44540	94040	138580
Natomas Metro Airport, part of Natomas Central Mutual WC, and North- gate 880 Service Area of SCWMD	82000	960	9160
Rio Linda Rio Linda WD	0	9190	9190
Sacramento South Suburban and Parkway service areas of Citizens Utility, Fruitridge Vista WC, Tokay Park WC, Florin County WD, the south area of Sacramento City, and Southwest area of	94100	32395	126495
Sacramento North North part of Sacramento, North Natomas, Arden-Arcade area, and South Natomas. SCWMD	2130	24645	26775
Clay WD Clay WD	4190	5300	9490
Section VIIA PM:12/15/93	- 126 -	Conservation Element	

<u>SUBAREA</u>	<u>SURFACE WATER AF/YR</u>	<u>GROUNDWATER AF/YR</u>	<u>TOTAL</u>
Elk Grove			
Elk Grove WW and Grantland 99 service area of SCWMD	0	4570	4570
Galt, City of			
City of Galt	0	2900	2900
Galt ID			
Galt ID	7340	50000	57340
Other Folsom South Canal Users			
Unincorporated area east of Hwy 99 and between Omochumne- Hartnell WD and Galt ID.	0	20000	20000
Omochumne			
Omochumne-Hartnell WD	10400	31000	414000
Southwest			
Area west of Hwy 99 and south of Laguna-Elk Grove	0	106000	106000
Sunrise			
Unincorporated area south of the American River and east of the City of Sacramento water rights service area.	2000	30000	32000
		Total Use	628050

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SACRAMENTO COUNTY PLAN
CONSERVATION ELEMENT

SECTION VII

A. WATER RESOURCES
BACKGROUND REPORT

4. GROUNDWATER OVERDRAFT

Continuing groundwater overdraft has been occurring in various parts of the County since the 1940's. While groundwater can continue to meet some of the water needs in these areas, new or increased surface water supplies should be secured in the immediate future in order to protect the viability of the groundwater resource. Continuation of current practices will result in further decline of groundwater levels with corresponding increased pumping costs and possible degradation of groundwater quality.

As shown in Figure 7, there are three distinct cones of depression in Sacramento County, indicating that past and current groundwater pumpage in these areas has significantly exceeded sustained yield quantities. These areas have an immediate need for imported surface water to meet current demands.

Changes in Storage

Changes in storage can be computed from the change in water levels. The change in water level elevations was determined from spring water level contour maps. Estimated annual changes in storage in acre feet for the period 1962 through 1968 are listed in Table 8. Using the average specific yield of 7.5 percent, the average decline in water level is about 0.5 foot per year.

Table 8

ANNUAL CHANGE IN STORAGE FOR 1962 TO 1968

<u>Year</u>	<u>Annual Change in Storage (AF)</u>
1962	-19650
1963	51510
1964	-170960
1965	29560
1966	-196200
1967	303440
1968	-157700
Summation	-160000
Average Annual	-22860

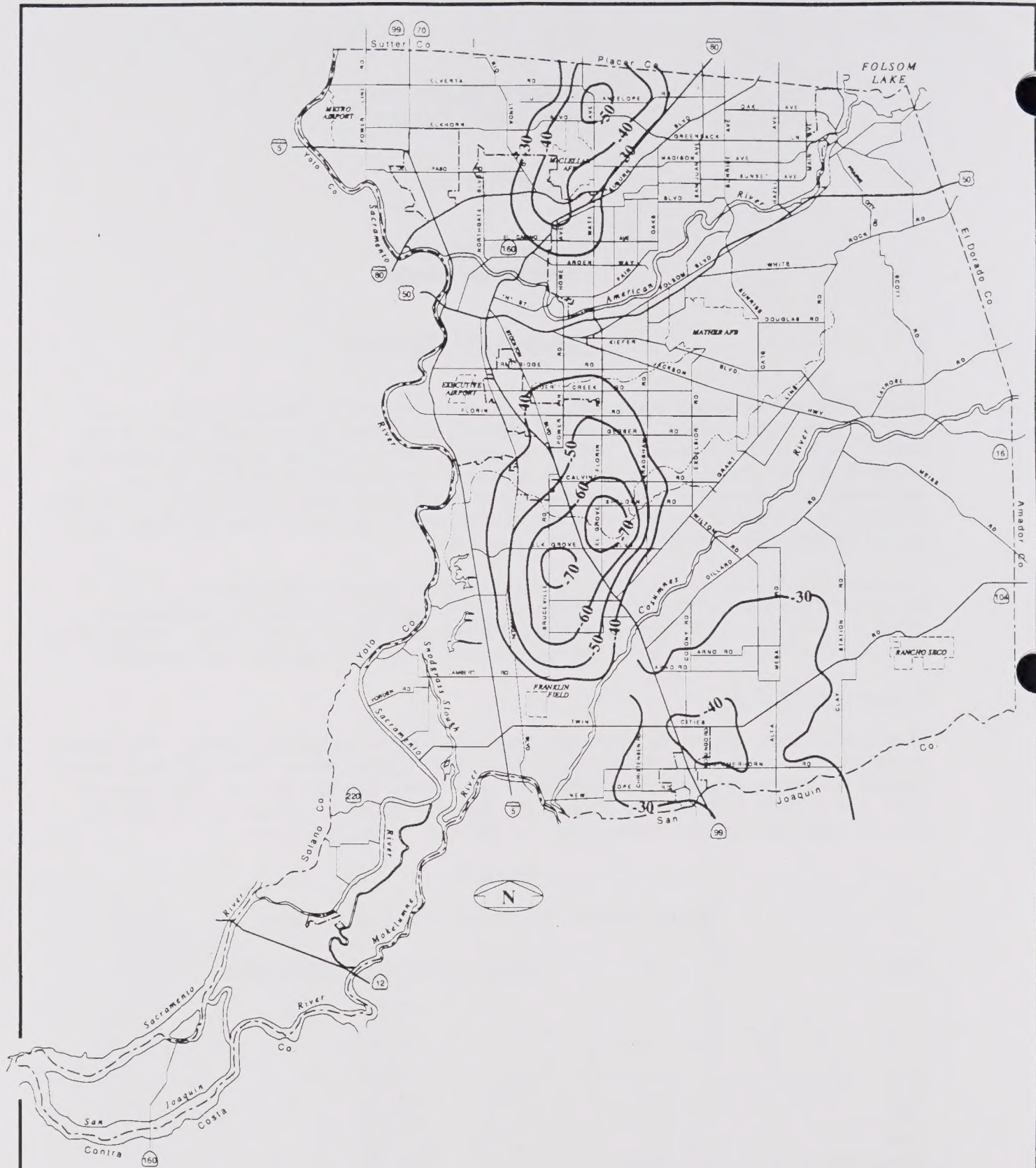


Figure 7

Groundwater Overdraft Areas Spring 1991 Groundwater Elevation

Prepared by the Sacramento County Planning and Community Development Department



See Table 5, in section 2. under groundwater for sustained yield estimates.

Problems With Overdraft

A few purveyors within the County have indicated little or no problem with their current water supply situation. However, most purveyors were concerned about growth and resulting need for additional water. While some purveyors expressed belief that additional wells could meet future needs generated by projected growth, most indicated an interest in securing new or increased surface water supplies. In many cases, surface water supplies will be necessary because groundwater is not present in sufficient quantities to meet future demands without exceeding the sustained yield values.

In general, most purveyors have reported that the quality of groundwater is suitable for all beneficial uses. It usually meets drinking water standards contained in Title 22 of the California Code of Regulations; occasional chlorination is required. However, secondary drinking water standards for iron, manganese and other constituents have been exceeded at some locations, making additional treatment necessary. Existing community water systems, including their wells, may not be required to meet the Maximum Contaminant Levels (MCL) specified at 23 CCR Sec. 64473. New wells, however, must adhere to the MCL standards. Purveyors expressed their concerns that new wells will therefore require additional, expensive treatment and that water costs could increase significantly.

The aquifer systems and the quality of water contained therein are presently inadequately defined to be able to identify a pattern as to locations where water quality problems are encountered. Groundwater quality problems have been found in some wells in the northern part of the County. In the south area of the County, particularly south of the City of Sacramento and westward, wells drilled to a depth of 400 to 600 feet are generally found to contain high levels of iron, manganese, hydrogen sulfide, methane, and iron bacteria. In this same area, the quality of water found at depths of 200 to 300 feet is excellent and no treatment has been required.

Recently, in an area east of Highway 99, wells have been drilled to depths of 900 feet. Water production from these wells, which presumably produce from the Mehrten Formation, has generally been very high, exceeding 2500 Gallons Per Minute (GPM). However, small amounts of iron, manganese and hydrogen sulfide have been found in groundwater produced by some of these wells. The source of these constituents is unclear at this time. Their source may be in deeper water-bearing zones, in shallower zones or in both; or their presence in wells may be the result of poor well construction practices.

Groundwater contamination has been reported at a number of locations. This contamination is primarily from organic solvents and wastes at the following sites: The Aerojet-General property east of Rancho Cordova, McClellan and Mather Air Force Bases, the Army Depot in South Sacramento, and the Southern Pacific and Union Pacific yards in downtown Sacramento. The area south of McClellan AFB also has been the location of a pumping depression for a number of years. Such depressions tend to exacerbate groundwater contamination

problems, as many contaminants will migrate down gradient toward the trough of the depression. Because of localized groundwater contamination, McClellan AFB now receives water from Rio Linda Water District and Northridge Water District, and Aerojet now receives surface water from the City of Folsom. Groundwater at the Metropolitan Airport is marginally acceptable for drinking purposes, as contaminant levels approach or exceed MCL's specified at 23 CCR Sec. 64435. Cleanup operations are either underway or are being planned. Other problems, besides contamination, arise when groundwater overdraft occurs. These are; subsidence of the earth as the water supporting it is drawn away; increased drilling and pumping costs as the water becomes harder to extract; and increased treatment costs as more lower quality waters requiring treatment for contamination are extracted when higher quality waters have been depleted.

Current Use Versus Sustained Yield

Current use of groundwater exceeds estimated sustained yield amounts for groundwater in Sacramento County. The total current use is 380,000 AF/yr. while safe yield is 357,000 AF/yr. resulting in an overdraft of 23,000 AF/yr. See Table 5, Section B. for sustained yield estimates.

SACRAMENTO COUNTY PLAN
CONSERVATION ELEMENT

SECTION VII

A. WATER RESOURCES
BACKGROUND REPORT

5. PROJECTED WATER DEMAND

Assumptions

The calculation of future water needs in the County for the year 2015 assumes the following:

- There will be no net increase in agricultural land. Urban pressures may cause a net reduction in cropland in some subareas.
- Water demand factors for all land use categories except residential remain constant. Per capita residential demands are reduced in some subareas due to increased densities.
- Current non-urban land will be developed in the order of land valuation. Vacant land and nonirrigated farmland will be developed first, followed by general irrigated farmland and rice farmland.
- All vacant land that is currently zoned commercial and industrial will be fully developed by 2015.

Agricultural:

It is assumed, for the purpose of estimating future agricultural water need, that total crop acreage will not increase in the future. This assumption is based on the following:

1. Most of the economically developable farmland in the County is already in production.
2. Soil surveys further indicate that the great majority of agriculturally suitable land within the County is already in use.

A number of the subareas are projected to experience a reduction in irrigated agriculture. Planned building patterns (zoning) and a population increase will completely eliminate general agriculture and reduce rice acreage by two-thirds in the North Sacramento subarea by 2015.

Commercial and Industrial:

All vacant land that is currently zoned as commercial and industrial is assumed to be fully developed by 2015. Total Commercial and Industrial need amounts to approximately 10 percent of the 2015 projected total water need for the County. Land thus developed will be withdrawn from non-urban land. Water factors and area employment patterns are assumed unchanged, with subarea water demand calculated from SACOG's estimate of employment for 2015.

Residential/Parks/Schools:

- Residential: Most subareas are expected to experience an increase in residential density by 2015.
- Parks: It was estimated that known 1987 acreage will increase in proportion to subarea population projections so that acreage to population ratios remain unchanged.
- Schools: The student yield factor (.44 student/house) and water factor of 0.024/AF/pupil/yr. remain constant for 2015 predictions. SACOG's housing distribution was used to predict school water use.

Results:

Table 9 summarizes the projected 2015 water supply need for the County. The total need is 886,000 AF/yr. excluding conveyance losses and 931,000 AF/yr. assuming a 5 percent conveyance loss factor. The 931,000 AF/yr. projection represents a 22 percent increase over the calculated current water demand.

Table 9

Estimated 2015 Water Supply Need In (AF/YR)

Area	Total Need	Total Need plus Conveyance Losses
Carmichael	15,622	16,403
Cordova	14,423	15,144
Folsom, City of	42,879	45,023
Multi-District	105,871	111,166
Natomas	70,217	73,727
Rio Linda	13,461	14,134
Sacramento N.	93,184	97,843
Sacramento S.	155,438	163,210
Clay WD	10,119	10,625
Elk Grove	23,041	24,193
Galt, City of	8,722	9,158
Galt ID	77,942	81,839
Orochumne	50,743	53,281
OFSCU	23,004	24,154
Southwest	115,170	120,928
Sunrise	66,414	69,734
TOTAL =	886,249	930,562

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VII

A. WATER RESOURCES
BACKGROUND REPORT

6. IN-STREAM WATER NEEDS: AMERICAN RIVER

IN-STREAM BENEFITS

Introduction

As early as 1915, the City of Sacramento planned for development of recreational parks within the American River floodplain. The City established the first park in the vicinity of the "H" Street Bridge in the 1920's. The County of Sacramento also planned for development of recreational sites along the American River. However, the purchase and development of riverfront property proceeded slowly and in piecemeal fashion until the completion of Folsom Dam in 1956. Then, pressure for urban development adjacent to the river spurred efforts to preserve open space along the river. In 1959 the County established a Department of Parks and Recreation to develop a detailed plan of park needs along the American River. The American River Parkway Plan was approved by the Board of Supervisors in January, 1962, and was incorporated into the recreational element of the County General Plan. A systematic land acquisition program was initiated, and by 1986 Sacramento County had acquired over 4,000 acres of parkway land at a cost of 22 million dollars.

In addition, the 23 miles of the American River below Nimbus Dam has been designated as a recreational river by the Secretary of the Interior under the National Wild and Scenic Rivers Act (U.S.C. 1271 et. seq.) and is given the same designation by the State under the State Wild and Scenic system (Public Resources Code 5093.50, 5093.54(3)).

Recreational Values

The American River Parkway is unique among urban rivers in the United States. Running through the center of the Sacramento Metropolitan area, the river and parkway provide a public recreational resource of great value and regional significance; it has no equivalent in California and few equivalents in this country. The parkway provides an outstanding variety and quality of recreational opportunities in the heart of a major metropolitan area. The parkway is California's largest urban riparian area. The parkway is managed to balance the dual goals of preserving natural, or open space, and protecting environmental quality within the urban environment, and at the same time contributing to recreational opportunities in the Sacramento area.

Recreational possibilities in the American River Parkway include such diverse activities as hiking, bicycling, picnicking, birding, horseback riding, canoeing, kayaking, rafting, sailing, power cruising, and swimming, to name a few. Some of these activities are water-dependent, such as rafting, swimming, or fishing; others are water-enhanced, such as bicycling, hiking, or picnicking.

The parkway contains developed parks such as Discovery, Ancil Hoffman and Goethe parks, as well as areas set aside in their natural condition. The Jedediah Smith Bicycle Trail permits parkway users to bicycle the full 23 miles from the confluence of the Sacramento and American Rivers at Discovery Park to Nimbus Dam. The bicycle trail then continues along Lake Natomas to Folsom State Park. Separate equestrian trails extend for many miles along the parkway.

A wide range of special activities takes place in the parkway, including nature study at the Effie Yeaw Nature Center, Take-a-Kid Fishing Day, Eppie's Great Race (triathlon), a kite festival, and other organized programs. The parkway is also an excellent place for those who simply wish to relax in pleasant surroundings.

Riparian Vegetation Values

The riparian vegetation acts as a buffer between the lower American River and the surrounding urban development. This vegetation, together with the river itself, are the most prominent features of the Parkway, and contribute greatly to the recreational experiences there. Many species of wildlife use the riparian vegetation for sources of food, cover, nesting sites, roosting areas and migratory corridors. Riparian vegetation is recognized by ecologists as being among the most productive wildlife habitat in the state.

Riparian Vegetation and Floodplain Relationships

The parkway's riparian vegetation and the river system are dynamic and interdependent. As the lower American River moves down and across its valley, the river attempts to erode its banks and cut deep channels at the outside of a bend where the water is swift, and to deposit the eroded fines and gravels farther downstream on the inside of a bend where the water is slower. When the river overflows its banks, the water slows and deposits its sediment load on the floodplain. Spring runoff can leave deposits of moist, nutrient-rich soils upon which riparian plant seedlings become established. However, sediments deposited by the spring runoff, and any seedlings germinated there, are susceptible to removal by floods occurring within the next several winters.

Winter flood events on the American River rework sediments in the active channel too frequently to allow many seedlings to survive. Floods during December, January and February average 46,000 CFS, and are considerably higher than average spring runoff. Production and survival of the riparian vegetation on the semi-confined lower American River is dominated by these flood processes.

Riparian vegetation on the lower American River has adapted its reproduction processes by re-sprouting after damage from floods. The "scour and re-sprout" process is more important on the lower American River than seedling germination. Following the large 1986 flood (130,000 CFS) this re-sprouting process produced vigorous new stands of cottonwood 25 to 30 feet above the summer low-flow channel.

Riparian Vegetation and Wildlife

The parkway supports a wide variety of birds and wildlife. More than 220 bird species have been recorded in the parkway. Sacramento County estimates that 30 mammal species, 13 reptile species, and 6 amphibian species also inhabit the parkway. The possibility of catching a glimpse of deer, beaver, blue heron, or wild turkeys adds to the pleasure of parkway users. The riparian habitat is important not only as a breeding grounds for resident animals, but also as wintering grounds and migratory corridors for nonresident species.

Ponds

The Parkway includes a number of off-channel ponds that have high wildlife value. Ponds are found at Sacramento Bar, Arden Bar, Rossmoor Bar, just upstream of Discovery Park, and in Ancil Hoffman Park Golf Course. Bushy Lake is also located within the parkway. These ponds were mostly developed during the late 1960's and early 1970's when tailing mounds from the gold dredging era were excavated for the production of aggregate. Water surface elevations in the ponds are controlled, in large measure, by water surface elevations of the river nearby. These ponds provide some of the most important riparian habitat for wildlife.

Fisheries

The lower American River has 41 reported species of fish. Of these species, nine are anadromous (they live mainly in salt water but ascend freshwater rivers to spawn). The most abundant anadromous fish in the river are chinook salmon, striped bass, American shad and steelhead trout. These fish are all sensitive to changes in stream flow levels, sediment loads, warm temperatures, and low dissolved oxygen content. In addition clean gravel is required for spawning and fry rearing.

Establishing Minimum In-Stream Flows

Recommended Minimum In-stream Flows For The Lower American River

Since completion of Folsom Dam, public attention has been increasingly focused on the Lower American River's fishery and recreation values. Construction of the dam was followed by public debate and governmental action to establish the Nimbus Fish Hatchery and in-stream flow standards to protect salmon and steelhead trout populations in the Lower American River. Over the years, essentially four flow regimes have been proposed. These are as follows:

Decision 893 - The Existing Legal In-stream Flow Requirements

This decision, established in 1958 by the California State Water Resources Control Board (SWRCB) in connection with the Folsom Water Rights permitting process, requires the Bureau to release a minimum flow of 250 to 500 cfs below Nimbus Dam. This was the minimum flow used in the original planning of the Auburn-Folsom South Unit in the early 1960's. Releases of 500 cfs would be made from September 15 through January 1, with a minimum release of 250 cfs during the remainder of the year.

Decision 1400 - Post-Auburn Dam Flow Conditions

This decision, made in connection with the Auburn Water Rights permitting process, was made in 1972 after a series of public meetings. This decision established post-Auburn Dam flow conditions between 1,250 and 1,500 cfs. In the absence of Auburn Dam, minimum flows would continue to be governed by D-893.

County of Sacramento - Minimum Recreation Flows

The County of Sacramento has prepared documentation on what it considers to represent the minimum flows consistent with the avoidance of permanent impairment to the Lower American River Parkway's recreational values. These flows range between 1,750 and 3,000 cfs as follows:

2000 cfs from October 15 through February
3000 cfs from March through June
1750 cfs from July through October 14.

Department of Fish and Game - Minimum Flows for Fish Reproduction

The in-stream flow needs are as follows, regardless of hydrologic conditions if fish populations are to remain unaffected:

<u>Month</u>	<u>Flow in CFS</u>	
October	1,750	
November	2,000	
December	4,250	
January	6,000	
February	5,000	
March	4,800	
April	4,600	
May	4,100	(+477) *
June	3,750	(+493) *
July	3,500	
August	3,400	
September	3,000	

*Additional flows included to meet the needs of smolt migration, shad attraction flows, temperature control, and gravel recruitment.

East Bay Municipal Utilities District Lawsuit

Background

The single issue, which has spawned 17 years of litigation to date is whether, pursuant to a 1970 contract with the Bureau of Reclamation, EBMUD may divert 150,000 AF/yr. from the Folsom Reservoir at the Folsom-South Canal or whether the mandates of Article X, Section 2 of the California Constitution and public trust doctrine require that the diversion occur below the confluence of the American and Sacramento Rivers. Plaintiffs and intervenors contend that the EBMUD diversion and consequent reduction of in-stream flows will cause substantial ecological harm to riparian habitat, fisheries, and recreational resources. Plaintiffs and intervenors further direct their concern to the cumulative impact of the EBMUD diversion in combination with projected appropriation and diversion of American River water in response to expanding urbanization and population growth.

EBMUD contends that the evidence is insufficient to demonstrate any appreciable harm to public trust values; that principles of California Water Law require the recognition and implementation of its contract rights; that sound public policy requires that high quality drinking water be obtained from the best available source; and that the Folsom Dam was constructed pursuant to objectives and purposes that preempt state interference. Each side advanced a number of issues which the Court considered individually.

Summary of Decision in EBMUD Case

Judge Richard A. Hodge in the Superior Court of Alameda County made a "Physical Solution" in the case of the Environmental Defense Fund v EBMUD. The important points are:

- ERMUD will be allowed to divert water at the Folsom-South Canal if the conditions below are met.
- The following in-stream flow requirements must be met as a condition of the diversion:
 - 2000 cfs from October 15 through February
 - 3000 cfs March through June
 - 1750 cfs July through October 14.
- An additional 60,000 AF must be maintained in reserve from mid-October through June for release in accordance with the recommendations of the Department of Fish and Game in response to specific fishery needs.
- EBMUD shall use its best efforts to divert as much water as possible during those times when in-stream flows are least required for protection of environmental interests.
- During such periods when flow requirements physically cannot be met, EBMUD may not divert any part of its appropriation. Defendants shall not divert water except to meet the demands of customers within the ERMUD Utility District.

- ERMUD shall not market nor sell its water to any third party, particularly agricultural interests.
- ERMUD shall contribute to the cost of maintaining a viable fishery and riparian habitat in the Lower American River.
- The foregoing flow regimen is not merely "interim" in nature. It is intended as a permanent, constitutionally mandated prerequisite to diversion.
- The Court will appoint a special master to monitor the physical solution upon terms and conditions to be agreed upon by the parties.

Implementation of The Decision

The Court maintained jurisdiction for the purpose of implementing the "Physical Solution" and providing for its modification in the event of new information on the American River which may come from one of the government agencies (i.e., DFG or FWS) which continue to study the river or the special master. John Williams of Carmel Heights, California. He will oversee all activities and research on the Lower American River to coordinate these activities and further advise the Court on possible changes or modifications to the decision which may be necessary.

SACRAMENTO COUNTY PLAN
CONSERVATION ELEMENT

SECTION VII

A. WATER RESOURCES
BACKGROUND REPORT

7. SOURCES OF ADDITIONAL WATER

It is obvious, when Sacramento County's current groundwater and surface water supplies are compared to the projected 2015 water needs, that the County must develop new water supply sources in order to meet the future needs of the area and stop the present groundwater overdraft condition that exists in the County. Potential sources of additional water are discussed here.

Central Valley Project Water

The purchase of water from the Central Valley Project (CVP) is traditionally considered to be the primary source of additional water for the County. The United States Bureau of Reclamation (USBR) has not entered into any new long-term contracts to supply water within the CVP since 1979. At that time, the United States Department of Interior declared a moratorium on CVP water contracting while the USBR and California Department of Water Resources (DWR) resolved questions of their respective responsibilities regarding water quality standards for the Delta. In 1986, the USBR and DWR concluded a Coordinated Operation Agreement which resolved these questions. Congress authorized execution of this agreement by USBR the same year. The Secretary of Interior lifted the contracting moratorium following execution of that agreement. USBR intends to undertake contracting of available, uncommitted CVP water, subsequent to the filing of the Final Environmental Impact Statements on the proposed water contracting.

The USRP estimates that the available remaining firm water supply of the CVP is approximately 1.1 million AF/yr. Eighty-four agencies have made requests for supplies from the CVP totalling 4.2 million AF/yr. The USBR determined that the 4.2 million AF/yr. could be reduced to 3.4 million AF/yr. and that that total would meet agricultural, municipal and industrial (M&I), and wildlife refuge needs within the CVP service area. Requests for water from the American River totalled 610,000 AF/yr. and the USBR, after reviewing each request, adjusted this total request down to 542,000 AF/yr. which it determined would meet the region's needs. USBR's calculated water supply needs for the American River Service Area, along with current American River contracts and water rights entitlements, are shown in Table 10.

Three types of allocations will be made: firm, conditional, and intermittent.

Firm Yield - Water supply available from the operation of CVP facilities in all but dry and critically dry years when shortages occur. The amount of yield is premised on (1) ultimate conditions (traditionally equated to year 2020 level of development), and (2) operations studies of the 1928-1934 critically dry period to establish deficiency criteria. The operations studies use historical hydrology modified to show the level of depletion, accretions, and demands appropriate for 2020 development and reflect coordinated operations with the State of California as set forth in the Coordinated Operations Agreement (COA).

Interim Water - The difference between firm yield and the level of firm yield demand in any year. Prior to 2020, demands for firm yield supplies are assumed to be below their contractual maximum; thus, interim water can be contracted until the firm yield demand has built up to the contractual maximum.

Intermittent Water - The USBR proposes to use this term to denote a supply of water above firm yield which, when added to the supply, would constitute the total amount of water that could be contracted. This supply would be used in combination with groundwater through a conjunctive use program to expand the total supply of water that could be contracted by the USBR. This water could be contracted on an annual, short-term (longer than one year but less than 20 years), or long-term (up to 40 years) basis. The amount of water that could be delivered under this type of contract would not be as dependable as firm yield since the intermittent supply would depend on the type of water year (wet, normal, or dry), the total amount of water that could be delivered to users, and the quantity of water delivered each year to firm yield contractors. The probability of delivering an intermittent supply would be calculated on the basis of past hydrology and the ability to meet firm yield demands based on the 1928-1934 dry year period.

The USBR proposes to allocate approximately 317,150 AF of water annually to areas in Sacramento County. All of Sacramento County would receive 174,200 AF of firm water and 22,050 AF of intermittent water for municipal and industrial uses, and 60,450 AF of firm water and 60,450 AF of intermittent water for agriculture. The final amount of firm and intermittent water may be adjusted, depending on the capability of the groundwater basin to be used in conjunction with intermittent supplies. The USBR has acknowledged, informally, that insufficient water may have been allocated to meet Sacramento County's water needs. Sufficient quantities of intermittent water should be available to meet any shortfall.

The USBR based its proposed allocations on the following considerations:

Allocation to areas where major conveyance facilities already exist and any required construction would be for delivery facilities only.

Allocation to areas currently authorized for service.

Allocation to the areas of origin to the extent there is conveyance capacity.

Allocation to meet the full needs of wildlife refuges.

Allocation in a manner that strongly encourages conjunctive use of surface and groundwater.

Allocation in a manner which considers total available supplies, including integration of safe yield of local groundwater supply.

Of the six considerations listed above, five apply to Sacramento County. USBR's allocation considerations give the County and Central Valley wetlands needs priority for future allocations of CVP water.

Prior to entering into new long-term water contracts, the USBR is required by the National Environmental Policy Act to prepare Environmental Impact Statements (EIS's). The USBR has prepared three draft EIS's covering the three distinct geographical areas to be served by the new CVP water contracts: the Sacramento River Service Area, the American River Service Area, and the Delta Export Service Area. The draft EIS's were filed with the Environmental Protection Agency (EPA) on December 29, 1988. Public hearings were held in March. The required comment period was extended and closed on April 3, 1989. The draft EIS's have recently been withdrawn by the Secretary of Interior. It is unclear, at this time, whether the draft EIS's will be redrafted and refiled or if the Secretary plans significant changes in the USBR's water market strategy. It is therefore not possible to predict just when the water the USBR proposes to allocate to Sacramento County will become available.

The contracting process is also vulnerable to a number of factors and events that cannot be wholly controlled by the USBR and its contracting partners. These include:

1. The SWRCB is reviewing existing water standards established by D-1485 for the Bay-Delta Estuary. These standards address salinity and pollutant levels, as well as minimum flow requirements for fisheries in the Estuary. New long-term CVP contracts will include provisions, like most of the existing contracts, to allow the Bureau to reduce the firmness of the water supplied to CVP water contractors should the SWPCB allocate more water than presently required by D-1485 to the Bay-Delta Estuary. Reduced firmness means the contractors will experience shortages more often and the severity of those shortages will be greater. The USBR contracting strategy assumes this contract language will allow new long-term CVP contracts to go forward before the SWRCB finalizes new water quality standards for the Bay-Delta Estuary.
2. As mentioned above, three draft EIS's on water contracting were prepared by the USBR for three distinct geographical areas. The draft EIS's were prepared separately under the assumption that contracting in each area could proceed separately regardless of the status of the process for the other two areas. The draft EIS's include a cumulative analysis of impacts in all three areas and contracting from any single area could be delayed by a court challenge until all three have completed the process.
3. SWRCB has issued a work Plan to review the USBR's and the City of

Sacramento's American River water rights. The stated purpose of this review is to determine the appropriate flow to be maintained in the Lower American River. It is unclear at this time what will emerge from the SWRCB's review, but the review will integrate the results of several studies, the Boyle Engineering supplement to the Water Plan, the USBR's American River Service Area Water Contracting EIS, and developments results of the EDF v. EBMUD litigation.

U.S. Bureau of Reclamation
Recognition of Needs of American River Service Area:

The following table (Table 10) shows the USBR's recognitions of future needs for the American River Service Area by agency.

Table 10

U.S. Bureau of Reclamation Projected Needs for the American River Service Area
for 2020
(1,000 AF/YR.)

<u>Agency</u>	<u>Contractual & Water Rights Entitlements</u>	<u>Additional Need</u>	<u>Total Need</u>
MISCELLANEOUS			
Placer County CVP Water	117.0	---	117.0
Placer County Water Rights	120.0 ₁	---	120.0
Natomas Ditch Diversion	32.0 ₁	---	32.0
North Fork Ditch (San Juan)	33.0	---	33.0
Folsom Prison	4.0	---	4.0
El Dorado County CVP	7.5	---	7.5
El Dorado Water Rights	47.5	---	47.5
City of Roseville	32.0	---	32.0
MISCELLANEOUS SUBTOTALS	393.0	0.0	393.0
FOLSOM LAKE			
Folsom, City of	0.0 ²	20.9	20.9
Mather Air Force Base	0.0	0.4	0.4
San Juan Suburban Water District	11.2	26.1	37.3
Citizens Utility Company	0.0	21.6	21.6
Northridge Water District	0.0	13.2	13.2
McClellan Air Force Base	0.0	2.5	2.5
Rio Linda County Water District	0.0	6.8	6.8
FOLSOM LAKE SUBTOTALS	11.2	91.5	102.7
SACRAMENTO COUNTY WATER AGENCY			
Folsom-South County Irrigation	0.0	---	0.0
Area 1	0.0	29.0	29.0
Area 3	0.0	46.0	46.0
Orochumne-Hartnell Water District	0.0	12.0	12.0
Galt Irrigation District	0.0	31.0	31.0
Clay Water District	0.0	2.7	2.7
Galt, City of	0.0	9.9	9.9
Laguna/Elk Grove	0.0	77.7	77.7
Sunrise East Area	0.0	17.2	17.2
SUBTOTAL AGRICULTURAL WATER	0.0	120.7	120.7
SUBTOTAL MUNICIPAL & INDUSTRIAL	0.0	104.8	104.8
SACRAMENTO COUNTY WATER AGENCY SUBTOTALS		225.5	225.5

<u>Agency</u>	<u>Contractual & Water Rights Entitlements</u>	<u>Additional Need</u>	<u>Total Need</u>
OTHER SACRAMENTO COUNTY			
Folsom-South Canal:			
EBMUD	150.0 ₃	---	150.0
SMUD	75.0	---	75.0
Losses	20.0	---	20.0
City of Sacramento	230.0	---	230.0
Carmichael Water District	10.8	4.2	15.0
Riparian	41.0	---	41.0
OTHER SACRAMENTO COUNTY SUBTOTALS	526.8	4.2	531.0
SAN JOAQUIN COUNTY			
North San Joaquin Water Conservation District	0.0	57.0	57.0
Woodbridge area	0.0	13.0	13.0
Stockton East Water District	0.0	49.0	49.0
Central San Joaquin Water Conservation District	0.0	22.0	22.0
San Joaquin County Flood and Water Conservation District	0.0	31.0	31.0
Stockton East Water District	0.0	49.0	49.0
SAN JOAQUIN COUNTY SUBTOTALS	0.0	221.0	221.0
TOTAL AGRICULTURE		292.7	
TOTAL MUNICIPAL & INDUSTRIAL		249.5	
TOTAL - AMERICAN RIVER	931.0	542.2	1,471.2

1. City of Folsom Water Right (22,000), S. CA Water Co. (10,000).
2. Included in Natomas Ditch Diversion.
3. Includes 15,000 AF Water Right (City of Sacramento).

Conclusion

Sacramento County has viable options available to obtain the quantities of surface water needed to meet the County's projected 2015 water supply demand and to stop the existing groundwater overdraft condition. Surface water can be delivered with little or no effect on American River flows if diversions are moved downstream to the Sacramento River, except those that presently appear extremely difficult to move downstream, and if a diversion and distribution system is constructed that allows the surface water to be used as the base water supply and the groundwater resources available to the area to be used to meet peak spring and summer months demands. This system should be designed to eliminate any negative impacts the diversion alternative had on American River flows in the spring and summer months of above and below normal water years. Protecting the American River flows from adverse flow impacts by moving the County's diversions to the Sacramento River will cost the County approximately \$17 million a year more than it would cost to divert directly from the American River.

City of Sacramento Water Rights and Entitlements

As mentioned in Part B of the Background Report, the City of Sacramento currently has water rights to approximately 245,000 AF of water per year from the American River; however, this is the diversion limit for the year 2030. The annual limit is based on an increasing schedule which began in 1963 see Table 1. Only about 57,000 AF/yr. is currently required to meet existing demand. This excess supply is obviously very important and would greatly benefit Sacramento County Water Agency as well as other water districts who rely on groundwater resources if it becomes available. The City of Sacramento also has water rights to 81,800 AF/yr. from the Sacramento River. The City's total demand was about 90,000 AF/yr. in 1989.

TABLE 11

CONTRACT SCHEDULE FOR AMERICAN RIVER AND FOLSOM SOUTH CANAL
FOR THE
CITY OF SACRAMENTO

<u>Year</u>	<u>Entitlement (AF/YR)*</u>	
1975	75,000	(4,000)
1980	90,000	(7,500)
1985	102,000	(7,500)
1990	115,000	(7,500)
2000	151,000	(13,500)
2010	185,500	(15,000)
2020	223,500	(15,000)
2030	245,000	(15,000)

*Includes water which goes to SMUD a maximum of 15,000 AF/yr. Amounts in parentheses.

Each river has a specific as well as restricted territory which it can serve. Water from the Sacramento River can only be used to serve property within the Sacramento City Limits. This is a legal requirement which cannot be altered by negotiations. But, as territory is annexed to the City, it is entitled to Sacramento River water. Water from the American River, however, can be delivered beyond the City Limits within boundaries known as the American River Place of Use (POU). The map, Figure 4, Section B, illustrates the existing boundaries for using American River water. To date, the City of Sacramento has contracted to sell or distribute American River water only to Arcade Water District and Del Paso County Water District, both of which meet the requirement of being in the POU. Currently, negotiations are underway to try and develop criteria for the possible distribution of American River water outside of the POU.

Memorandum of Understanding

Reliance solely on groundwater is becoming increasingly expensive because water levels continue to decline and construction costs continue to rise. As a result of the various water issues and concerns, the Metropolitan Water Plan recommended that the City and County execute an agreement to implement a regional water plan. To date, no final agreement has been reached, however, the County and City have adopted a Memorandum of Understanding (MOU) to facilitate future negotiations.

The City of Sacramento and the County are at a crossroads with regard to development of surface water. There are volumes of studies and reports available which document the groundwater overdraft and underutilization of surface water available to the community at large. The Sacramento County Water Agency (SCWA) and the County have taken lead roles in developing groundwater management authority. However, that management is dependent in large part on the cooperation of the City as it has the surface water entitlements, treatment and distribution system which is capable of expansion, and the experienced staff trained to operate the water system. Recognizing the City's capacity and the County's need, the two governing bodies extended a Memorandum of Understanding (MOU) to logically and efficiently provide water to the greater Sacramento metropolitan area. The purpose of the MOU is summarized below.

Expansion of the City's water treatment and supply system to functions as a regional water utility under the direction of the City of Sacramento to serve a predetermined service area made up of the City of Sacramento and portions of the unincorporated area, both inhabited and uninhabited, appears to be the most logical and efficient way to proceed. Based upon the findings of the Metropolitan Water Plan, which outlines the respective roles of the City and the County. This Plan best meets the objective of an integrated ground and surface water program. On July 14, 1987 the City and County executed a MOU. Subsequently, this MOU was restated on April 5, 1988 to clarify and broaden the scope of the original agreement as summarized below:

"...recognize the need for conjunctive use of groundwater and surface water in the Sacramento area, to renew the bond of cooperation between the parties to plan together to resolve mutual water supply concerns, and to

serve as an agreement for planning by establishing a Technical Advisory Committee to study and prepare a proposed conjunctive use program for consideration and possible adoption by the parties after appropriate environmental review."
Per Resolution No. 88-0381.

Highlights of MOU Agreement

1. Properly balance use of groundwater and surface water by:
 - a. Utilizing City's existing surface water rights to the maximum extent.
 - b. Seeking and utilizing additional surface water rights and entitlements.
 - c. Limiting and managing groundwater use.
2. Provide equitable financing to construct City facilities for treatment, storage and conveyance of water.
3. Appoint Technical Advisory Committee
 - a. Purpose - Plan a proposed conjunctive use program and appropriate policy.
4. Policy Issues: Investigate and consider feasibility and desirability of:
 - a. Providing City water service outside City Limits but within American River POU on a wholesale basis.
 - b. Provide City service outside City limits and outside American River POU. The City would not utilize its own water rights and entitlements. The City would process, treat, store and distribute wholesale water if a public water agency could obtain their own permanent water rights from USBR.
 - c. Delivery of water in (a) and (b) is conditional upon acceptable financing.
5. City should assess and collect water connection fees on new development within City to finance its appropriate share of capital improvements.
6. City and County should develop and implement a groundwater management plan to halt overdraft, protect water quality.
7. Establish appropriate groundwater management zones with the ability to levy and collect groundwater charges.
8. Establish appropriate surface water benefit zones which are or will be benefitted by surface water supplied by the City.
9. If the conjunctive use program is adopted, the City and County should mutually guarantee debt repayment in an equitable manner.

10. The City Council, County Board of Supervisors, and the Agency Board of Directors have the power and right to approve or deny any proposed conjunctive use program(s). The same parties shall also consider the results of environmental review and compliance with CEQA.
11. MOU may be terminated by mutual agreement or by a party giving one year's prior written notice.

(Note: IF the City/County consolidation is approved, it would no longer be necessary to reach an agreement, however, there may be some technical, design, engineering and environmental issues to be resolved. Water supply issues would not be the stumbling block, provided the City's existing water rights and entitlements succeed or can be transferred to the consolidated entity.)

In order for SCWA to obtain a firm water supply contract for surface water, it will need to either acquire the necessary water rights and entitlements from the State Water Resources Control Board (SWRCB) or it would have to secure a contract to purchase water from the USBR. Once a water supply contract has been obtained, SCWA would then need to enter into a "wheeling agreement" with the City to treat and deliver this water through the City's treatment plant and water distribution system. A second way to obtain surface water would be to purchase water directly from the City, which would both wholesale and deliver (wheel) water. However, this alternative would require the City to modify or amend its American River POU boundaries.

A fee ordinance has been established to fund the necessary capital improvements to treat, transport, deliver, and store water once it becomes available. The problem continues to be the inability of SCWA to successfully negotiate a water supply contract from either SWRCB or the City (provided appropriate amendments to POU boundaries can be obtained). It should be noted the County (SCWA) has recently adopted Resolution 89-2002 on December 19, 1989, offering to participate in the cost of financing an additional water intake near the mouth of the American River. This is one of several project alternatives currently being studied by the City in its environmental impact report for the E.A. Fairbairn Water Treatment Plant expansion project. It is likely that several major issues must be resolved before a final decision on the project can be made. Questions have been raised regarding the trade-off between maintaining water flow in the American River (environmental concerns) until it reaches the Sacramento River versus the cost to construct, operate and maintain a pipeline that will pump water back upstream to the plant. There may also be a reduction in water quality associated with the downstream intake structure. The proposed solution, together with the many alternatives, will generate extensive study and debate before a final decision can be reached. However, the proposed expansion of the Fairbairn Plant is not intended to serve any areas outside of the current American River POU. It is one step needed to deliver water to the unincorporated areas, provided water supplies become available.

Unused SMUD Entitlement

The SMUD contract for 60,000 AF/yr. of American River water for cooling the Rancho Seco Nuclear Generating Plant was executed in 1972 and expires in 2011. In addition, the City has dedicated 15,000 AF/yr. of its 245,000 AF/yr. of American River water as transport water for SMUD. Future use of CVP water for Rancho Seco is in doubt as the public recently voted to close Rancho Seco, and SMUD has indicated that it will abide by that direction.

The 60,000 AF/yr. from the American River was originally meant to provide cooling water for two nuclear power plants the size of Rancho Seco, however, it now seems likely that Rancho Seco will remain closed and no new nuclear plants will be built. Discussions with several technical and legal representatives of SMUD have been held to explore the possibilities of the County purchasing a portion of the water SMUD no longer needs. The USBR has traditionally opposed transfer of unused contract entitlement water. That agency has argued the water user should amend its contract entitlement if the water is not needed. The USBR has proposed selling water to those currently under contract and to others, such as the County, on an interim basis. In contrast to past policy, the USBR has also expressed a desire to encourage water transfers for specific reasons, such as groundwater recharge. The USBR may, therefore, support the interim use of SMUD water by Sacramento County for recharge of depleted groundwater aquifers in the southern part of the County, a suggestion that has received favorable attention by SMUD officials. The County will need to explore this possibility with representatives of SMUD and USBR.

Auburn Dam

History

In 1965, the Auburn Dam Project was approved by Congress. If completed, it would have delivered water to Sacramento County, San Joaquin County, and the East Bay Municipal Utility District via the Folsom-South canal. In 1975, the project was stopped when the earthquake in Oroville raised questions about the seismic stability of the dam which is built on a similar fault feature. By 1977, funding for Auburn had been permanently removed by the Carter administration which declared it both economically and environmentally unsound. In 1984, President Reagan stopped federal involvement in water development projects, thus withdrawing any hopes of federal funding for the Auburn Dam. Severe flooding in 1986 revived the Auburn Dam concept and by 1987 the Corps of Engineers was studying several different plans for the Auburn Dam site. Among these were the original plan for a full-scale, multipurpose dam, a flood control only dam, and several types of expandable dams (dams built primarily for flood control, but which can be expanded at a later time for multipurpose use).

Current Status

Currently, no consensus has been reached on what, if any, type of dam should be built on the North Fork of the American River. Environmentalists and the U.S. Fish and Wildlife Service both claim that severe environmental damage will result if Auburn Dam is built. Associated wetlands, 42 miles of riparian canyons, riverside forests, and whitewater stretches will all be affected by a dam on the North Fork of the American River. The flood control dam is the least damaging to the river itself, however, other indirect environmental effects are concentrated down river in the Sacramento area. These environmental effects are related to increased flood protection which potentially increases development. Increased growth can cause increased air pollution, reduce farmlands, and decrease wetlands.

Flood control is currently of great concern for Sacramento County since the Federal Government has imposed building moratoriums, and private flood insurance costs are up. The Auburn Dam issue is seemingly no closer to resolution than it ever has been. Sacramento County is supporting the least expensive and equally effective flood control dam. Placer and El Dorado Counties are pushing for a full-scale multipurpose dam in the hopes that they will get some water from it. SWIM (Sacramento Water Intelligently Managed) supports a middle-sized dam for water, power and flood protection; and environmentalists are fighting all proposals for another dam on the American River.

Cosumnes River

History

The Cosumnes River basin was studied by the Bureau of Reclamation in the 1960's, and a feasibility study for a dam on the Cosumnes River was conducted. In 1979, a concluding report was issued by the USBR and determined that under the federal government's criteria for project analysis a feasible project could not be built. Also in 1979, the Cosumnes River Association was revived through the sponsorship of the Counties of Amador, El Dorado, Sacramento, and San Joaquin. A report was prepared for the Association indicating that a project on the Cosumnes River could be built and paid for through the sale of water and hydroelectric power.

The Cosumnes River Water and Power Authority was formed through a joint powers agreement between Amador and El Dorado Counties. The Authority was joined by Sacramento and San Joaquin Counties in January, 1983. After several years of study and efforts to find buyers for the project's water supply and power, the Authority issued requests for proposals for a "turn key" approach to preliminary studies, water rights and power permits, project design, and construction. No responses were received and on April 28, 1987, the Sacramento County Water Agency withdrew from the Authority.

Current Status

The Cosumnes River Association dissolved in 1988 because of increasing awareness of the project infeasibility. While the costs of the project - both environmental and construction - were steadily increasing, the revenue from power sales which were supposed to finance the project were steadily decreasing. There was some hope that East Bay Municipal Utilities District would take an interest in the project and contribute to financing, however, they have not. At this point, the Cosumnes River project seems to be a dead issue.

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SACRAMENTO COUNTY PLAN
CONSERVATION ELEMENT

SECTION VII

A. WATER RESOURCES
BACKGROUND REPORT

8. WATER CONSERVATION

Conservation Programs

Water conservation could reduce the projected 2015 water demand. Reductions in water use can be accomplished through several means ranging from voluntary programs to mandatory water rationing. Voluntary programs and residential water metering are discussed below, along with the effects of reduced use on river return flows. It is assumed that mandatory water rationing would be instituted only under emergency situations, such as severe water shortages.

Ongoing Programs

Voluntary Programs

The Sacramento Area Water Works Association (SAWWA) is a Sacramento County organization of waterworks management personnel. One of its functions is to promote water conservation. All of the water districts within the County are currently participating in SAWWA's ongoing voluntary water conservation campaign. Through the work of this group and individual water district conservation programs, water consumption in Sacramento dropped approximately 30 percent during the 1976-77 drought. The ongoing programs continue to promote voluntary conservation in Sacramento County. The City of Sacramento has noted a 13 percent reduction in use this last year (1989). Water district membership and application of conservation measures suggested by SAWWA are voluntary.

Emergency Drought Measures

During emergency drought situations several voluntary procedures combined with monitoring and some enforcement procedures have proven very effective in reducing water usage. Some of these measures include:

- Odd-Even Landscape Watering Days - houses with odd street numbers water on odd numbered days and houses with even street numbers water on even numbered days.
- Prohibitions on:
 - °Landscape water between noon and 6:00 pm, when evaporation is highest.
 - °Washing sidewalks and driveways unless necessary due to health hazard.

°Washing vehicles unless using a bucket and hose with stopper nozzle.

- Water Police - patrol for people violating prohibitions. Violators will be warned and repeat offenders often face fines of up to five times their monthly water bills. This is an enforcement measure and may or may not be used depending on whether the program is voluntary or mandatory. This is usually dependent on the severity of the drought situation.

Water Metering

General Discussion

The Sacramento Metropolitan area is the largest unmetered water service area in the State. In order to charge for water according to the amount delivered, water must be metered. If customer's water bills are the same regardless of how much water they use, they have little incentive to use water efficiently. Metering in conjunction with pricing structure influences water use by providing a continual means to tie water charges directly to the amount of water used by the customer.

Advantages and Disadvantages

Advantages

- Provides an economic incentive for consumers to use less water.
- Could reduce consumption in Sacramento County by an additional 15-20 percent.
- Reduced water demand due to metering could mean that costly enlargements of the distribution system could be postponed and that less water would be required from expensive new sources.
- In most cases the cost to install meters will be recovered in the rates charged for water service. These costs should be recovered in about three or four years.
- With metering, utilities can more easily locate and pinpoint system water leaks, and can eliminate sources of unnecessary water loss. (It is estimated that 4 percent of urban water deliveries are lost to system leakage every year.)

Disadvantages

- In a study done by the city of Denver, Colorado in 1985, it was found that metering, in itself, does not affect the amount of water consumed. Metering must be used in conjunction with pricing rate structures.
- Initial installation costs and operation and maintenance costs would be high; ranging from \$250 to \$500 per meter installed. Retrofitting existing unmetered homes is estimated to have a total cost of anywhere from \$67 to \$135 million.
- Metering installation in Sacramento County would increase the average residential billing by 38 percent to 69 percent over current prices which average \$7 to \$8 per month.

- Saving water in Sacramento County is somewhat redundant as 95 percent of all indoor water used and 19 percent of all outdoor water used in the County returns to the Sacramento River for eventual reuse.
- Metering will save approximately the same amount of water that is currently being saved through voluntary conservation measures now in place. It is unlikely that water metering and pricing will induce enough additional water savings (estimated additional savings would be 2 percent) that the cost of installing meters will be justified.
- Equity issues: Costs distribution and implementation time frame will effect the equity of increased costs of water metering.

Costs of Metering

Several studies have been done to determine costs of installation and operation and maintenance of residential water meters. Costs to install range from \$250 to \$500 per unit. Due to the many variables included in meter installation, it is impossible to develop a single cost for a residential meter installation. Contributing to this wide range in costs are several factors:

- labor rates,
- differing materials costs,
- back or front yard installation,
- manual or machine excavation,
- size and type of meter installed,
- retrofit or new construction.

There are also several factors which could further increase the installation costs:

- public relations during construction (replacement of lawns, fencing and other landscaping),
- costs of installing new billing apparatus (computer programs, equipment, personnel, vehicles, and supplies),
- engineering costs for materials or contracts (i.e., bids, locating services, problem solving, contract administration),
- salaries for new employees (inspectors, engineers, laborers, and clerical).

Many of these costs were absorbed into purveyors' budgets and were not included in the estimated cost to install meters.

With installation costs between \$250 and \$500, it would cost between \$67 and \$135 million to install meters in the County's 271,000 unmetered homes. This cost would be completely paid by water customers through fees attached to their monthly water bills. The average water meter lasts approximately 15 years. At 8 percent interest, the annual (amortized) cost is between \$29.23 and \$58.46 per meter. Annual operation and maintenance cost for one meter is \$8.18 per year (\$2.92 for maintenance and \$5.26 for reading, logging, and billing). Therefore, the total additional monthly charge to install water meters is \$3.11 for the \$250 price and \$5.55 for the \$500 price.

Although metering existing homes may be expensive, installing meters at the time of construction is not. It costs only \$60 to provide a new home with metered water service.

Options for Ease in Installation

A water metering program poses many problems for Sacramento County. The Boyle report, Water Plan Supplement, done for SCWA outlines three strategies which could simplify the transition to meters both politically and economically.

Meter Installation in New Homes and Upon the Resale of a Home

Under this strategy, property owners would be required to install meters at their own expense when a residential property with no meter is sold, or a new home is built on a vacant lot. After several years of this intermittent installation, remaining unmetered water services would be required to install meters. This could be accomplished under either individual programs administered by individual water purveyors or by a county wide program administered by an agency formed just for this purpose or SCWA or SAWWA. Several payment structures are available to encourage early installation, and to provide the lowest initial costs for the water users and purveyors.

Examples include:

- Higher rates for unmetered services in order to pay for meter installation.
- No rate structure differences until mandatory meter installation program begins. Then charge higher rate for those who waited until this time to install meters.

Public Awareness Programs

A public awareness program on conservation values for fee increases imposed as metering is implemented. Programs should be continuous to ensure all users conserve as much as possible. Particular attention should be paid to programs which educate consumers about the high cost of summer water use. If the public understands the reasons for water metering and know how to avoid high bills by conserving, metering programs will face much less resistance. Also, when meters are installed, a transition period is needed to allow customers to adjust to the new pricing scales. It is usually better to start the public awareness programs long before meters are installed and metering started. This especially is true if metering is scheduled to start during the summer months when water usage is high and rates are usually increased in order to increase conservation.

Core Organization

A core organization is formed by the County to administer the metering program. This allows for volume purchases of quality materials and services, standardized installation procedures, and a stronger position for negotiation of financing. This organization would coordinate installation (both new and retrofit), help to lessen adverse public reaction, enforce meter sizing specifications and installation methods, and deal with legal and financial constraints and labor considerations.

Metering and Strategies

As mentioned earlier, in order for water meters to act as water conservation devices they must be used in conjunction with a conservation oriented water pricing technique. Meters, in conjunction with a suitable rate schedule, can decrease water use by up to 30 percent especially immediately following installation. As people become adjusted to the higher prices, over time the savings decrease to around 15 percent of the pre-meter water use.

Current Efforts to Require Meters

Assembly Bill 3222, requiring metering in unmetered areas of California with more than 800,000 residents would require water meters to be installed on all new homes and would give homeowners until the year 2000 to retrofit existing homes with meters. This bill was specifically targeted at Sacramento County since it was aimed at unmetered areas with more than 800,000 residents and other unmetered areas like Fresno, Kern, Placer, Sonoma, and Sutter Counties do not meet this requirement. The bill made it through the Assembly but was withdrawn by the sponsor while still in committee in the Senate. AB-3222 is typical of bills introduced almost yearly by other areas of the State which are currently metered. Although both the City and County continue to strongly oppose metering. There is a realization that it may be politically advantageous to install meters. The amount of water conserved after installation, however, may not be much greater than the amount that has been achieved through voluntary programs. Installing meters may give Sacramento better standing when competing with metered areas for new or expanded water rights by helping to show that Sacramento is aware of and willing to do something about the water shortage problems faced by the State.

Reclaimed Water

Reclaimed wastewater from commercial, industrial, agricultural, and domestic uses is an important supply source for many areas of California where existing water supplies are scarce or expensive. In areas where groundwater and surface water have been plentiful, as in Sacramento County, reclamation of wastewater has not been aggressively pursued. Current trends toward conservation of natural resources, however, are causing a resurgence of interest in this very important source.

Accepted Uses of Reclaimed Water

Over the years, reuses of reclaimed wastewater have gained acceptance by public health organizations and the general public. Table 12 lists wastewater reuses and a short explanation of each. As described in Table 12, Irrigation Reuse, and Groundwater Replenishment, are addressed here as they could provide the most immediate benefits to Sacramento County. The other classifications of reuse are generally more complex and deserve more detail than is possible within the scope of this paper.

Table 12

Types of Wastewater Reuse

<u>Type of Reuse</u>	<u>Description</u>	<u>Current Status</u>
Industrial in-plant recycling	Multiple recycling and/or treatment.	Extensively used, especially in Western US.
Municipal reuse	Process water for wastewater treatment municipal power plant cooling, fire protection and irrigation of public sites.	Widely utilized but generally only portion of potential. Numerous California applications.
Industrial reuse	Distribution of partially treated wastewaters from municipal plants for industrial process & cooling waters.	Rapidly growing acceptance. Several applications and many feasibility studies are under way in California.
Irrigation reuse	Reuse of partially treated wastewaters for agricultural & landscape irrigations. Degree of necessary treatment varies from primary to secondary plus filtration.	Extensively used, on seasonal basis, in CA. Application and degree of treatment established by State Health Department.
Groundwater replenishment	Incidental and intentional spreading and/or injection of treated wastewaters for replenishment and/or hydraulic barriers for subsurface waters.	General use in California especially in water deficient regions. Partial demineralization proposed in areas where wastes are high in TDS.
General use recycling	Recycling and distribution of treated wastewaters for general uses except drinking and washing.	Isolated applications. None in CA, but may be feasible in water deficient regions.
Potable use recycling	Recycling and distribution of advanced treated water & partially demineralized wastewaters for all uses.	Non-intentional U.S. applications. Acceptance by public is gradually increasing but majority reject. Regional Sanitation District examining feasibility.

Groundwater Replenishment

Reuse practices for groundwater replenishment generally consist of spreading and/or injecting reclaimed wastewater on open land (open space, agricultural land, or parks) over groundwater tables to supplement natural replenishment. Along the coast this procedure is used to form subsurface hydraulic barriers to prevent salt water intrusion. Large scale utilization of reclaimed water for groundwater replenishment would require strict groundwater management practices to prevent adverse variations and impairment of groundwater quality. Such impairment could include significantly higher total dissolved solids, higher nitrates, increased hardness, and other effects upon quality parameters. Nitrates and other nutrients found in reclaimed water can be of beneficial use for irrigation/fertilizer and, in that application, can have a value of \$20 to \$40 per acre foot. These same nutrients, however, can have an adverse effect on domestic waters and must be kept separate from a groundwater basin used for domestic water supplies. Proper application and groundwater basin management are necessary for successful replenishment programs.

Irrigation

In 1981, approximately 184,000 AF of reclaimed water was used for agricultural irrigation in California. By 1986, this use had increased to approximately 300,000 AF a year. Within the County two smaller wastewater treatment facilities presently provide reclaimed water to local farmers to irrigate fodder crops. However, much of the approximately 170,000 AF/yr. of treated wastewater from the Regional Wastewater Plant presently flowing into the Sacramento River could be retained and used in the Sacramento area.

The Regional Plant is located on a 3,000 acre parcel adjacent to the Sacramento River, approximately four miles south of Sacramento Executive Airport and approximately two miles west of the Cosumnes River. Treatment plant facilities cover 1,000 acres, and the remaining 2,000 acres serve as a buffer for surrounding properties. The Plant provides secondary treatment for wastewater and consistently meets public health requirements. The effluent from the plant is discharged into the Sacramento River just south of the town of Freeport. Presently, the average daily dry weather flow through the plant is 150 million gallons per day. Regional Sanitation has recently received grant monies to investigate the feasibility of using treated waste water for wetland restoration or other uses.

Existing Reclaimed Water Projects

In 1987, the California Department of Health Services reported that wastewater was reclaimed at over 200 wastewater plants and applied to more than 360 locations. A 1981 SWPCB Office of Water Recycling study provided an in-depth report on 21 of these locations. The results of this study showed that a wide range of field crops and some orchard crops were irrigated with reclaimed water with average annual wastewater use ranging from 560 AF to 16,800 AF, depending on location.

Table 13 lists all sewage treatment facilities in Sacramento County. It can be seen that three plants currently utilize treated wastewater for reclamation projects. The Rancho Murieta system is a model for self-contained application of reclaimed wastewater in a densely populated area, the effluent of the treatment facility meets strict health requirements through tertiary treatment. Additionally, all drainage from the site must be contained during initial rains and diverted back into detention ponds. Reclaimed water from the Rio Cosumnes Correction Center is used to spray irrigate alfalfa. Fields of alfalfa are flood-irrigated with water from the Walnut Grove facility.

Table 13

Existing Wastewater Facilities, Sacramento County

<u>Name/Location</u>	<u>Type of Treatment</u>	<u>Average Daily Flow, MGD</u>	<u>Reclamation Use</u>
Regional Treatment Plant	Secondary	150.000	No
Rancho Murieta	Tertiary	0.325	Yes
Walnut Grove	Lagoon	-0.100	Yes
Boys Ranch	Lagoon	-0.100	No
Courtland	Lagoon	-0.100	No
Metro Airport	Lagoon	-0.100	No
Rio Cosumnes Correction	Lagoon	0.150	Yes
Galt	Aeration Lagoon	0.650	Yes
Isleton	Lagoon	0.250	No

Health Considerations

Health and regulatory considerations govern use of reclaimed water for agricultural irrigation. The EPA, USBR, DWR, Central Valley Regional Water Quality Control Board (CVRWQCB), California Department of Health Services, and Sacramento County Environmental Health and Sanitation are responsible for regulating reclaimed water use in Sacramento County. CVRWQCB establishes water quality standards, prescribes and enforces wastewater discharge requirements, and in consultation with the Department of Health Services, prescribes and enforces reclamation requirements. Each reclamation project must have a permit from the CVRWQCB conforming to the Department of Health Services criteria.

Where there is minimal health risk, based on degree of contact and water quality, the regulations are liberal, allowing the use of primary effluent for surface spray irrigation of fodder, fiber, and seed crops and surface irrigation of orchards and vineyards. If food crops are surface-irrigated in a manner that allows no contact between edible portion of the crop and the reclaimed water, a disinfected, secondary treated effluent is acceptable. Tertiary effluent that is pathogen free is required for spray irrigation of all crops that are eaten or sold raw. Additionally, intensely used landscape areas such as parks and golf courses require tertiary treatment.

Xeriscaping Ordinances

What are Xeriscapes?

Xeriscaping is derived from the Greek word, Xeros, meaning dry. This concept involves planning landscaping which uses less water than conventional landscaping. The main principles involved are:

- Reduction of turf areas (grass consumes a lot of water).
- Use of drought tolerant plants.
- Grouping plants with similar water requirements together so that no plants are over or under watered.
- Careful design and implementation of irrigation systems to prevent water waste through over watering and "gutter flooding."

Xeriscaping and Other Jurisdictions

More than 50 communities have ordinances that require conserving water by appropriate landscape design (Xeriscaping). Goleta has one of the strictest, limiting the turf in new single-family homes and demanding efficient irrigation systems. The City of Santa Monica has an ordinance which requires reduced water consumption in landscaping through xeriscaping. It applies to all new multifamily, commercial and industrial projects. Plans which must be prepared by a California licensed landscape architect or other qualified person must be submitted to the planning department for approval before landscaping can begin.

Draft Xeriscaping Ordinance in Sacramento

The County of Sacramento has passed a xeriscaping ordinance to help promote xeriscaping as an efficient, low maintenance answer to all landscaping situations. By requiring xeriscaping the County hopes to help reduce the demand on water resources while convincing homeowners that xeriscapes are better than acres of thirsty, labor intensive lawn.

Statewide Xeriscaping Ordinance

Assembly Bill 325, introduced into the 1989-90 Regular Session, would require every city, county, and city and county to adopt a xeriscaping ordinance for all new developments within the city, county, or city and county by January 1, 1991.

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SACRAMENTO COUNTY PLAN
CONSERVATION ELEMENT

SECTION VII

A. WATER RESOURCES
BACKGROUND REPORT

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VII

B. MINERAL RESOURCES
BACKGROUND REPORT

INTRODUCTION

Mineral resources in Sacramento County include sand, gravel, clay, gold, silver, peat, topsoil, lignite, natural gas and petroleum (Figures 8 and 9). The principal resources which are in production are aggregate (sand and gravel) and natural gas. The natural gas production areas are located mostly in the Delta's Rio Vista Field, one of California's largest producing areas. There are three major and several smaller producers of sand and gravel in Sacramento County, the larger producers are located in the Fair Oaks and Perkins-Kiefer areas. They also produce asphaltic and Portland concrete cement along with free gold and silver recovered from the crushing process. Clay is surface mined in at least two location; topsoil from one location on the Cosumnes River. At present, peat and lignite deposits in the Delta are not commercially minded. Resource conservation issues associated with natural gas production and the lesser minerals are not significant. This plan focuses primarily on aggregate production.

This background report discusses four sections that pertain to the continued availability of construction aggregate in Sacramento County. Section A reviews past and present aggregate production rates, revised depletion estimates and updates the status of known reserves since publication of P.K. Morton's Aggregate Resource Report in 1986. Current production and reserve estimates were provided by local aggregate producers and are aggregated to protect the proprietary nature of the information. Section B evaluates Resource Sectors F and I for potential mining based on criteria used by the State Mining and Geology Board. Section C updates ongoing discussions on aggregate reserves on Mather Air Force Base and evaluation of the resource. Section D suggests alternative deposits located outside the Perkins-Kiefer area under exclusive ownership of local aggregate companies.

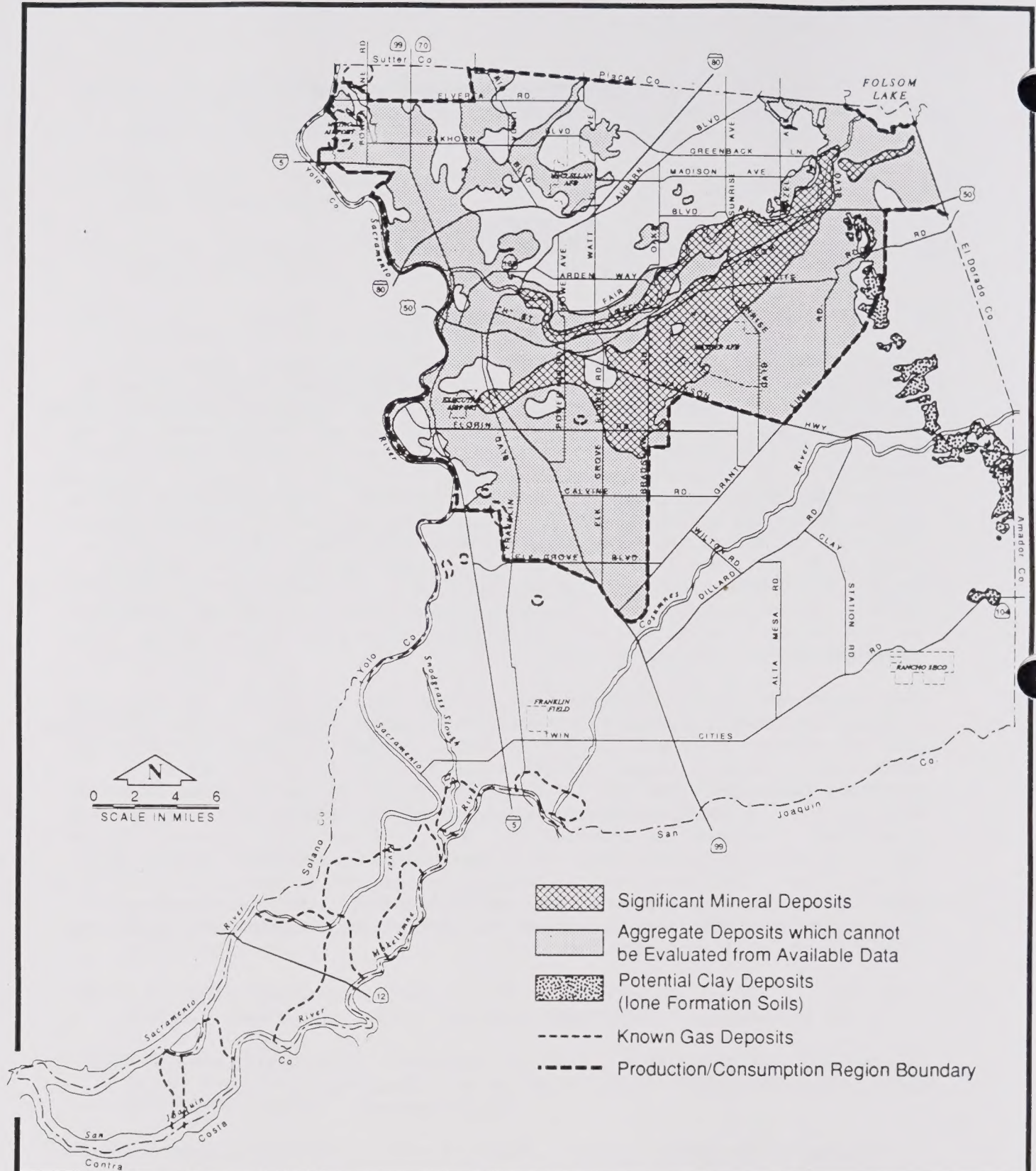


Figure 8
Mineral Resources

Prepared by the Sacramento County Planning and Community Development Department



Prepared by the Sacramento County Planning and Community Development Department

PRODUCTION AND ESTIMATED RESERVES

Production Rates: Production rates for construction aggregates in the American River Resource Area from 1960 through 1980 averaged 5.4 million tons, according to a 1985 study conducted by the California Division of Mines and Geology. In 1986, the consulting firm of P.K. Morton determined the three year average production rate of major aggregate producers in the American River Resource Area at 6.7 million tons/year.

To determine current projection rates, Planning staff contacted major local aggregate producers in the Spring, 1990. Their combined 1989 production amounted to 9.8 million tons. This significantly higher production rate (46 percent increase since the mid 1980's) can be attributed to increased demographic growth rates and increased construction activity in the Greater Sacramento Area. Sacramento County grew by 246,500 residents and added 93,700 housing units during the 1980's. The rate of growth has particularly accelerated over the last three years.

Estimates Reserves: The P.K. Morton report in 1986 estimated total resources of 161 million tons and total permitted reserves of 47 million tons within the American River Resource Area. The 161 million ton estimate represents resources judged to be of commercial quality and was derived from sector by sector yield estimates prepared by the State DMG in its 1985 study. Total permitted reserves are those resources owned by local aggregate producers and approved for mining. Based on these estimates and a stable depletion rate of 6.7 million tons/year, or by 2009.

The Planning Department's 1990 survey of major local aggregate producers indicated that total resources of these companies in the American River Resource Area amounted to 170 million tons, and total permitted reserves were 47 million tons (coincidentally, the same figure Morton used in 1986). The 170 million ton figure does include potential resources not owned or under option to individual companies, including the area generally south of Elder Creek Road. The reason for the discrepancy in the two estimates of total resources over the intervening four years is not clear, although it is probably a reflection of different methods of estimation. Presumably, local aggregate producers have conducted more thorough tests to determine potential yields from resources under their control.

SECTOR ANALYSIS

A key issue relevant to the General Plan is whether the likely resources within the American River Resources Area which are south of Jackson Highway and (except for Sector F-6 generally not owned by aggregate companies are viable areas for future surface mining operation. Portions of this area are designated as Aggregate Resources on the prior General Plan land use map, but corresponding (SM) Surface Mining Combining zones are not widely in place. Encroachment of incompatible land uses may affect the practicability of mining these resources. A second concern was whether aggregate resource planning and zoning designations have been effective in protecting the resource.

To address this question, staff conducted a sector analysis for the resource area south of Jackson Highway. The Boundaries of the sectors, as shown in Figure 10, were determined by the State in its 1985 study, and generally exclude agricultural-residential parcels. The MRZ-2 designation stands for Mineral Resource Zones where there is a high likelihood of significant deposits of PCC-grade aggregates. The small sectors I-1 and I-4 were not evaluated. The analysis included the following tasks:

1. Identify additional residential and other construction activity between 1977 (when aggregate resource protection was first established) and 1989, using aerial prints from those years.
2. Identify land use entitlements, including rezones, use permits and parcel maps, granted in each sector between 1977 and 1989.
3. Determine the number of agricultural-residential home sites on the periphery of each sector.
4. Determine the acreage and distribution of protective zoning designations.

The results of the analysis are summarized in Table 14. Based on this information, review of ownership patterns and discussion with aggregate industry representatives, Sector F-6, F-12, and I-3 have the greatest potential for future surface mining. Much of Sector F-6 is under ownership of local aggregate producers, it has large acreage and potential yield, 71 percent is zoned for surface mining, and it has good access to existing processing plants. Sector F-12 has over 300 acres, the second highest potential yield, good access to existing processing plants, and an average parcel size of 15 acres, although only sector south of Elder Creek Road that P.K. Morton recommended as economical to mine. At 340 acres it is the second largest sector, although the yield is estimated to be only 78 percent of Sector F-12. This reflects the decline in thickness and quality of the resource moving southward. Average parcel size is 11 acres, and 63 percent of the sector is zoned industrial reserve. Its major drawback is relatively poor access to existing processing plants.

The remaining sectors are considerably smaller in size, potential yield, and average parcel size. Surrounding agricultural-residential uses and approved and pending projects further constrain several of them. Local aggregate producers have demonstrated little interest in the area, believing that potential yields do not warrant major investment at this time. Moreover, they are proximate to the Central Valley Traction Railroad, which is under consideration as a major transportation corridor for urban expansion.

MATHER AIR BASE

The State study for the Sacramento-Fairfield Production-Consumption Region did not quantify aggregate potential underlying Mather Air Force Base because of assumed long-term unavailability. Renewed interest in the aggregate potential underlying Mather has surfaced with the prospect of its closure in 1995. Recovery of the resource could greatly extend Sacramento County's resource base and defer depletion of a local source of aggregate by several years.

TABLE 14
MRZ-2 SECTOR ANALYSIS
Sectors

	F-2	F-6	F-12	I-2	I-3	I-5	I-6
Acres*	73.4	681.331	314.7	203.0	339.6	161.3	161.9
Est. tons** (In Millions)	3.8	37.6	15.6	7.3	12.2	5.8	5.8
Total Zoning (acres)	M1,M1f &M2=44.3	M1,M1f,M1SM M2f=69.9	M1,M1f M1SM=211.8	M1=17.9	M1,M1f= 125.8		
Percent	60%	10%	67%	9%	37%	None	None
	IRf, IR=24.7 34%	IRSM,IR F=596.1 88%	IRSM,IR,AG, 160=102.9 33%	IR,IRF= 185.1 91%	IR,IRF= 213.8 63%	AG20,AG20 F=85.2 53%	AG20= 155.7 96%
	AR-2=4.4 6%	AR-1 AR-2=15.3 2%	None	None	None	A10,A10F =76.1 47%	A-10 =6.2 4%
% of Area In Floodplain							
Zoned: M1F,M2F							
	5%	3%	19%	None	18%	None	None
Zoned: IR(F),Ag-20(F)	26%	19%	None	33%	31%	6%	None
Zoned: AR10(F)	None	None	None	None	None	24%	None
% of Area in M1 (SM) & IR(SM)	None	71%	15%	None	None	None	None
Potential tonnages lost due to M1, M2 (In millions)							
	2.3	3.6	9.0	0.3	4.5	None	None
# of Parcels per sector	26	91	23	26	30	26	8
Average parcel size	3.0	7.5	15.0	8.0	11.0	6.0	20.0

* Sector acreage may not approximate actual acreage due to scale and planimeter errors.

** Portland concrete cement grade aggregate classified by CDMG

The Board of Supervisors has formed the Sacramento Area Commission on Mather Conversion (SACOMC) to study and make recommendations concerning the productive reuse of Mather AFB. Committees of SACOMC have received information from the aggregated industry, U.S. Bureau of Land Management, and the California Division of Mines and Geology that indicate construction quality aggregates exist at Mather AFB. A subcommittee examining natural resources issues associated with Mather reuse alternatives has indicated in its report that the potential yield in the southeastern part of the base may approach 41,385 tons/acre and that as many as 1000 acres might potentially be mined (Figure 11). This would amount potentially to an additional 15 years of aggregate reserves. However, more detailed site specific geologic data is needed before the feasibility of mining as an interim reuse option can be determined. Additional sampling and testing will occur in the fall of 1990.

ALTERNATIVE SOURCES

Potential sources of quality aggregate, in addition to the deposits classified as MRZ-2 exist within Sacramento County. These potential sources lie within areas that are classified MRZ-3, and include igneous rocks of volcanic origin and metamorphic rocks. In addition, untested MRZ-3 alluvial deposits that may provide alternative sources of PCC-grade aggregate include: dredge tailings; channel deposits; and beds of the River Bank, Modesto and Laguna formation.

Alluvium classified MRZ-3 includes river-channel deposits and dredge tailings in the Sacramento-Folsom area. Alluvium is considered desirable as PCC-grade aggregate because of its texture and ease of mining. Future PCC-grade aggregate needs may require a transition from the mining of premium quality alluvial materials in MRZ-2 areas to the mining of an inferior grade alluvium that requires more extensive and costly processing.

Additional PCC-grade aggregate exists in the floodplain and channel of Cosumnes River. State Geologists indicated that the quality of aggregates are mined along with topsoil at Wilton Road, and aggregate producers have purchased at least one tract in the Cosumnes flood plain. Further evaluation of the resource needs be conducted.

Potential crushed rock aggregate massive consolidated rock formations may provide an alternative to depleted PCC-grade alluvial deposits east of Sacramento in Placer and El Dorado Counties. However, economic considerations indicate that crushed rock cannot compete with alluvium PCC-grade aggregate resources that are available in the Sacramento-Fairfield Production-Consumption Region.

Another out-of-county source is the Yuba River near Marysville, a 40 mile distance from central Sacramento. This area represents a vast aggregate resource of high quality aggregate. Despite the distance, it remains a realistic future alternative. The Yuba River dredge fields contain a reported 1.5 billion tons or more of potential aggregate resources. The Yuba River is a more viable source than Cache Creek with Yolo County's current mining ordinance that limits mining below the channels Thalweg line.

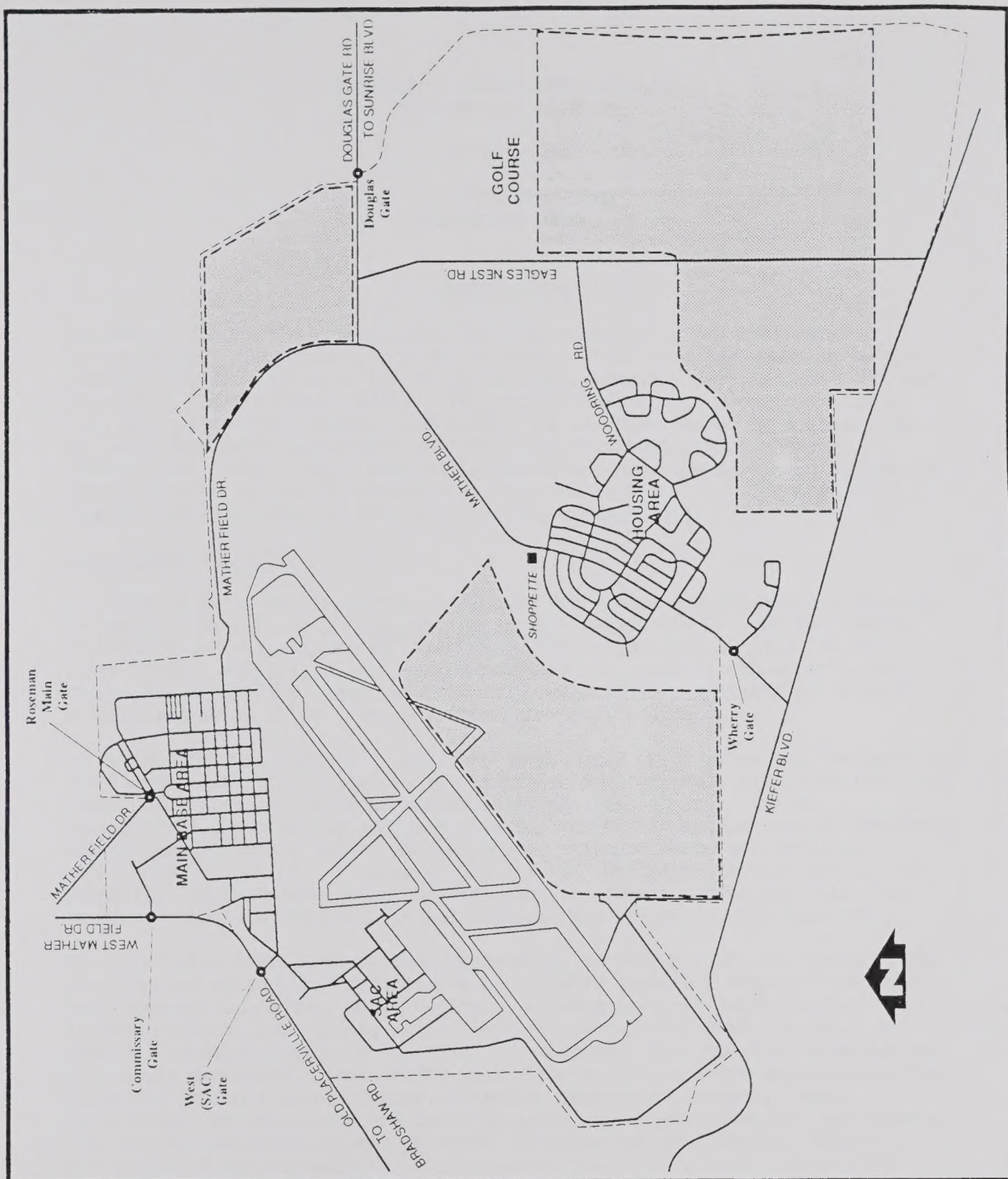


Figure 11
Mather Air Force Base
Potential Aggregate Mining Areas

Prepared by the Sacramento County Planning and Community Development Department

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VII

C. SOIL RESOURCES
BACKGROUND REPORT

INTRODUCTION

Sacramento County's successful agricultural economy is, and will remain, dependent upon the productivity of the soil. Three soil regions make up the County. The dark soils of the Delta area are primarily fertile peat comprised of slow to decay organic matter. The geologically recent flood basin soils, rich with organic and mineral compounds, are alluvium formed by historic and ancient flood depositing from swollen rivers overflowing into adjacent floodplains. Lastly, the bench soils, elevated above the spreading basins are river terraces and due to erosion and leaching lack the high percentage of organic material found in the Delta and flood basin soils.

SOIL CLASSIFICATION

To classify soils within Sacramento County two separate complimentary systems, devised by the U.S. Soil Conservation Service (SCS), can be used for ranking capability and suitability for crop use. Agricultural capability, an eight class series, defines soils based on physical and chemical characteristics. The soils suitability class reflects soil potential for suitable crops and prioritizes soils as to level of importance to crop production.

As defined by SCS, classes I and II are considered to be prime soil because the high level of fertility imposes few limitations on agricultural production, and almost all crops can be grown successfully on these soils. Limited agricultural soils are grouped into classes III and IV either because few crops can be grown on these soils, special conservation measures are required, or both conditions exist. Classes V, VI, and VII include soils that are suited primarily for rangeland, woodland, or wildlife habitat. Finally, soils and landforms that are unsuited for agricultural use are placed in Class VIII.

The California State Conservation Department, in conjunction with the SCS, has also adopted categorical definitions of suitably important farmland for land use inventory purposes. These definitions recognized the land's suitability for agricultural production, rather than solely reflecting the physical and chemical characteristics of the soil. To this end, the Important Farmland Map Series was developed, based on SCS soil surveys. It includes seven categories: prime (of national significance), statewide importance, unique, local importance, grazing, urban and built-up land, and other. The last two classes will not be addressed in this document. Minimum map unit for all these categories is ten acres.

Prime farmland is land which has the best combination of physical and chemical characteristics for crop production, as well as high soil quality, appropriate growing season, and adequate moisture supply to sustained high crop yields. Water management including reserves, transport, and delivery are assumed. Prime farmland must have been used for the production of irrigated crops within the last three years. Water source for the area must be available to produce crops eight out of ten years.

Farmland of statewide importance is land other than prime farmland which has a good combination of physical and chemical characteristics for crop production. The definition is similar to prime farmland except crop production characteristics are considered good, not the best. It must have been used for production in the last three years and have a developed irrigation supply available eight out of ten years.

Unique farmland does not meet the definition for prime or statewide importance, but is being used for specific high economic value crops. It has a special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality or high yields of specific crops. Such crops include, olives, grapes, walnuts, and pistachios.

Farmland of local importance is a category representing agricultural lands important at the local level. Farmland of local importance represents the county level of interest and commonly includes dry land agriculture or soils that if cultivated and irrigated would be prime or state-wide important farmland. Representatives from Sacramento County's farming community under the auspices of the State Conservation Department have developed a formal definition for land of local importance: "Lands which do not qualify as prime, statewide, or unique designation but are currently irrigated crops or pasture or nonirrigated crops; lands that would be prime or statewide designation and have been improved for irrigation but are now idle; and lands which currently support confined livestock, poultry operation or aquaculture."

The acreage breakdown as defined by the suitability classification for Sacramento County as of 1989 is 124,301 acres (19.6%) of the total county area of 635,825 acres are classed as prime; 80,398 (12.6%) are classed as statewide; and 12,130 (1.9%) are classed as unique. Due to recent changes in the definition, locally important farmland acreage is being recalculated.

RESOURCE CONSERVATION DISTRICTS

The continued viability of agricultural crop production is related directly to the preservation and conservation of the County's highly productive soils. To this end, farm community members have entered into agreements with the SCS to create three Resource Conservation Districts (RCD) in the southern portion of the County -- Florin, Lower Cosumnes, and Sloughhouse RCDs. In so doing district members are provided technical and financial assistance from the SCS. Technical assistance regarding such topics as crop rotation practices, irrigation technologies, wind row plantings, and soil enhancement are provided through individual contact with SCS staff scientists and conservationists. Additional education and information outreach programs include media contacts,

workshops, seminars, and tours of farms practicing soil and water conservation methods.

The Florin Road Conservation District is 91,480 acres and encompasses the Laguna and Morrison Creek drainages from the Sacramento River east to the County line. Farming is principally irrigated pasture, sudan grass and clover seeds, dry farmed and irrigated grain, hay pears, and row crops. Practically all irrigation water is trapped from the depleting groundwater table underlying the area.

The Sloughhouse RCD totals 197,440 acres of farm and rangeland lying on both sides of the Cosumnes River up stream from Highway 99. The District was formed to assist farmers and ranchers to effectively solve resource conservation problems.

The Lower Cosumnes RCD encompasses 98,000 acres and is situated in the Delta, extending up the Sacramento River to the lower Cosumnes River. The RCD was formed to assist landowners with the use and conservation of soil, water, and other related resources. Active participation by all members of the farm community within each district is encouraged by SCS, but is not mandatory. Some farm community members with these districts prefer to remain outside the RCD's jurisdiction and thus do not benefit from the technical and financial benefits related to soil conservation methods provided by SCS.

SOIL PRODUCTIVITY ISSUES

Sacramento County is fortunate in that the long-term agricultural productivity of its soils is generally not at issue as elsewhere in the Central Valley. Salt buildup in soils, perched water tables, toxic mineral concentrations, and wind erosion are, with two exceptions discussed below, not a problem.

Similarly, whereas overgrazing on fragile soils has significantly increased soil erodibility in some counties, grazing in Sacramento County causes only nominal damage to soil productivity. Grazing lands are concentrated in upland areas adjacent to flood plains and in the lowest reaches of the Sierra foothills. Limited oak and riparian woodland exist in some locations but, due in part to grazing, regeneration of woodland is slow to occur. Native California bunch grasses have long ago been replaced by grasses of Mediterranean origin. These introduced species are shallow rooted and develop a matting which reduces the soil moisture holding capacity and inhibits sprouting of native species. However, the grasses do exist in adequate amounts to retard erosion. Soils in these areas are usually not considered highly erodible due to a well defined matrix of organic and mineral compounds and the lack of topographic relief. Furthermore, most cattlemen in the area practice reasonably wise grazing and soil conservation methods.

Sacramento County's most significant soil productivity issue concerns the rich and fertile Delta peat soils, a sizeable portion of which are being lost to oxidation. These soils are undergoing subsidence that will potentially reduce or eliminate agriculture on some areas if conservation and sound soil management are not practiced. The Delta peat soils are made up of organic

soils ranging from unaltered plant materials to accumulation of highly altered structureless organics of jellylike consistency. Almost continuous submergence of peat prevents or greatly retards natural decomposition through oxidation. To grow crops on Delta peat soil, levees were erected creating diked off islands. This prevented continual submergence and allowed the peat soils to dry for cultivation. Drying saturated peat can reduce its volume by 50 percent causing land, soils, and surrounding levees to subside. The largest contributors to subsidence are oxidation of peat soils (exposing peat to the drying factors associated with air), shrinkage, and subsequent wind erosion.

The elimination of fertile soil through oxidation is not the immediate problem, although it is a long-term concern. Delta soils are 10 to 20 feet thick, and at an inch loss per year will still be productive for many decades. Rather, oxidation induced subsidence is the controlling factor for the future of agricultural production in the Delta because it has the potential to greatly reduce the ability of levees to withstand inundation. Subsidence of levees and crop covered islands is occurring, though levees lower at a slower rate due primarily to a slow oxidation process from reduced tillage and irrigation. The ability of levees to withstand major storm events is thus continually being reduced. Low bayward islands will lead to increased wave action on adjoining levees and eventual inundation may lead to succession of more inland Delta islands being inundated. Raising and strengthening levees to provide additional protection is exceedingly costly and may not be feasible. At some point, it will not be justifiable to repair levee breaks and pump islands dry.

Soil conservation efforts sensitive to the process of oxidation would lessen the rate at which Delta islands are subsiding. Ceasing all tillage of bayward islands, specifically Sherman Island, is advisable to moderate the subsidence process and maintain viable levees on this key island, thereby helping to protect the soil and agricultural productivity of Delta islands to the east.

A less significant, terms of acreage effected, but no less severe problem arising from subsidence of bayward Delta islands is salt water intrusion of subsurface fresh water. River water runoff during years of comparatively normal precipitation has been sufficient to retard salt water from intruding into the fresh water table. However, the rate of salt water intrusion of west Delta islands increases during years of below normal precipitation, causing damage to crops irrigated with subsurface water contaminated with salt water. Efforts to develop salt tolerant crops and a reduction in the subsidence rate might enable farming to continue on west Delta islands for a limited time. However, continuing crop production accelerates peat oxidation and potentially lessens irrigation water quality from salt water intrusion of subsurface fresh water sources.

URBAN CONVERSION OF CROPLAND

In recent years the County's productive cropland has been increasingly converted to urban uses. Between 1980 and 1989 total acreage in production fell from 374,857 acres to 252,555 acres, a decline of 122,302 acres. The 1989 figure was derived by combining harvested acreage of field crops (218,580 acres), fruit and nut crops (11,780), seed crops (10,310), vegetable crops

(10,770), and nursery production (1,115). In 1980, of the 630,400 acres comprising Sacramento County, 59.5 percent were in agricultural production. In 1989 this figure has dropped to only 40 percent. Gross value of production has not fallen as significantly, in part due to inflationary factors and demand for Central Valley grain, such as rice. In 1980 gross value was figured at \$221,189,400. In 1989 that had fallen marginally to \$216,760,000. As conversion of productive farmland continues, it permanently commits agricultural land to a nonproductive category, from the agricultural perspective. At the same time, there has been a decline in the area of land most suitable for agriculture.

To curb this decline and preserve soil productivity, and thus greater crop potential, programs to maintain prime, statewide and locally significant farmlands need to be instigated. One such option would be to establish policy which seeks to protect and maintain suitable agricultural lands within the County. Mitigation procedures for development of prime, statewide, or locally significant soils would necessitate off-site mitigation procedures. The mechanism for implementing this policy could be purchase of transfer of development rights from nearby farmlands as CEQA required mitigation for loss of productive agricultural land. Purchase of development rights would simply involve an acre for acre purchase of development rights in an area designated for preservation.

Transfer of development rights involves a more complicated ordinance requiring property owners in a designated development district to acquire a specified amount of development rights from land owners in a designated preservation area before they can develop in accordance with an adopted plan. Such a program would allow more flexibility and predictability for developers and probably would cost less.

Measures to preserve and maintain Sacramento County's most productive soils need to be implemented. The SCS assists agricultural producers in maintaining the viability of soil by offering expertise and financial assistance in soil conservation methods. The prime agricultural lands of the Delta are in danger of inundation if subsidence continues. Bayward islands, such as Sherman, should reduce or cease agricultural production to lessen subsidence and the potential for successive inundation of up Delta islands. Lost acreage of agricultural lands through conversion to urban uses is permanently withdrawing prime and statewide significant soils from agricultural production. Consideration of the inherent value of such land should be closely examined when deciding to develop or not develop on fertile soils.

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VII

D. VEGETATION AND WILDLIFE RESOURCES
BACKGROUND REPORT

1. INTRODUCTION

The County of Sacramento is fortunate to have several locations where vestiges of the once vast and diverse Central Valley natural habitat areas still exist. Habitat areas include riparian zones, riverine habitats, wetlands, woodlands, and grasslands.

Remaining marsh and riparian areas in the County include backwater basins and riparian woodlands along the Sacramento, American, and Cosumnes Rivers and other smaller waterways, and in the Delta. These biologically dynamic areas host thousands of waterfowl migrating along the Central Valley leg of the Pacific Flyway. In addition, numerous other migratory and resident species, some of which are listed as threatened or endangered, inhabit the County's natural areas. Species include majestic colony birds such as the American egret and great blue heron, the opportunistic coyote, the industrious beaver, deer, and elusive grey fox and bobcat.

The wetland and riparian areas are regarded as the County's most important resource. Such habitat becomes all the more significant when viewed against the acreage lost since the time of European settlement. Approximately 95 percent of the Central Valley's wetlands have disappeared in the last 100 years, reducing habitat for millions of migratory waterfowl. Riparian habitat has suffered a similar fate. In the Sacramento River Valley only 25,000 of the estimated 500,000 acres of the riparian habitat existing in 1850 exists today.

The aquatic environment of the County supports tens of thousands of anadromous fish and rears a comparable amount of resident species. Anadromous fish include salmon, bass, shad, and sturgeon. Resident fish include trout, catfish, sunfish, and bullhead. With the development of urban areas and water projects, fisheries have declined. This loss has been generated by habitat destruction, water diversion, and temperature increases.

Extending out from the riparian zone are the distinctive upland habitats of the Central Valley, scattered with oak, blanketed with grazinglands, and dotted with vernal pools. Native oaks, signature trees of the Central Valley have declined in population over the years to accommodate agriculture and development. Concentrated efforts will need to be undertaken if we are to preserve the isolated groves and diminishing woodlands. Native grasslands have virtually disappeared due to grazing and development. The once prolific and well adapted bunchgrass has been displaced by invasive weeds from the Mediterranean region. The vernal pools which once dotted vast areas of the Central Valley landscape, are found only in concentrations in the southern

section of the County. The pools sustain flora and fauna adapted to the ephemeral nature of these small yet vibrant habitats.

The County's natural vegetation and wildlife resources are important to the quality of life Sacramento area residents have come to enjoy and are vital to the maintenance of healthy interwoven ecosystems. Detailed knowledge of the resource holdings, as well as thoughtful protection strategies, will ensure that future generations will be able to enjoy, explore, and appreciate the Central Valley's unique habitat areas.

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VII

D. VEGETATION AND WILDLIFE RESOURCES
BACKGROUND REPORT

2. WILDLIFE OF SPECIAL INTEREST

Threatened and Endangered Animals. The Fish and Game Department maintains a list of threatened and endangered species in California. State and federal laws protect the habitat of these species through the environmental review process. Several additional species are of special concern or candidates to make the protected list. The table summarizes Sacramento's special status animal species. The Department's classification scheme is defined as follows:

A species is a candidate when the Fish and Game Commission has formally noticed it as being under review by the Department to determine whether listing as threatened or endangered is warranted, or when it is the subject of a proposed rulemaking by the Commission to list as threatened or endangered.

A species is threatened when although not presently threatened with extinction, it is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.

A species is endangered when it is in serious danger of becoming extinct throughout all, or a significant portion of, its range due to one or more causes, including loss of habitat, change of habitat, overexploitation, predation, competition or disease.

Waterfowl. Sacramento County is an important part of the Central Valley leg of the Pacific Flyway, where millions of waterfowl winter during their annual migration. The Beach/Stone Lakes area is the most important waterfowl area in the County, with 10,000 to 15,000 waterfowl using North Stone Lake alone in the early 1970's. Tundra swans, snow geese, white-fronted geese, Canada geese, mallards, pintail, blue-winged teal, cinnamon teal, green-winged teal, wood ducks, scaup, and ruddy ducks are found in substantial numbers on the water surfaces and surrounding vegetation.

Among the many non-game waterfowl species in Sacramento, the greater sandhill crane deserves special attention. Tall, stately birds with interesting behavior and ringing calls, they are one of California's more ancient avian inhabitants. The population in California is down to about 3,000 birds wintering in the Central Valley. Cranes are among the least tolerant of birds to human interference.

The great blue heron and snowy egret are other striking water birds frequently observed foraging in fields and wetland areas. Several rookeries exist in

Sacramento, which require minimal disturbance by human activity due to the birds' sensitivity.

Upland Game Birds. The ring-necked pheasant is a handsome game bird found throughout the County, but more commonly in interspersed agriculture, grassland, and riparian habitats. The lower Cosumnes River typifies this habitat mix and supports densities of 10 to 50 pheasants per 100 acres. Hunting opportunities are primarily limited to hunting clubs licensed by the Department of Fish and Game and to private hunting. There is a shortage of clubs throughout the state and especially in Sacramento.

Mourning doves and California quail are also common throughout Sacramento. A population of between 50 to 80 wild turkeys inhabits the upper American River and Aerojet lands. A second smaller population can be found in the vicinity of Rancho Seco.

Raptors. Sacramento and other foothill counties serve as major California breeding and wintering areas for numerous raptor species. They are found throughout Sacramento County, but the oak woodland and associated grasslands of the east County are the prime habitat area. Bald eagles nest east of Folsom Lake just outside the County and are an irregular winter visitor. Golden eagles, red-tailed hawks, red-shouldered hawks, and Cooper's hawk are the dominant foothill raptors. The northern harrier, Cooper's hawk, Swainson's hawk, and burrowing owl are species of special concern to the state and are comparatively common in Sacramento County. (See Table 1)

Deer. Mule deer reside in Sacramento County, but not in particularly large numbers. They are most concentrated on the oak woodlands of the east county. Densities may reach 20 per square mile in the vicinity of the Cosumnes and Deer Creek. Small resident populations of deer also exist in the lower Cosumnes and along the American River. There are no public hunting opportunities for deer in Sacramento County.

Fur Bearing Animals. Beaver, mink, river otter, raccoon, opossum, bobcat, badger, long-tail weasel, ringtail, grey fox and coyote occur in varying numbers along the riparian woodlands of Sacramento. Beaver dams periodically cause problems along waterways and have to be removed. Some beavers exist in the lower Delta, particularly the dead-end sloughs, but they are more common in San Joaquin County.

PLANTS OF SPECIAL CONCERN

Rare and Endangered Plants. The California Native Plant Society's inventory of rare and endangered vascular plants in California lists 10 species that have been found in Sacramento County which are characterized as rare or endangered according to either federal, state or California Native Plant Society definitions (Table 2). Six species are vernal pool species. California Hibiscus is found along the Sacramento River and is severely threatened by channelization of the river. The Antioch Dunes Evening Primrose is extremely rare and known from only one site in Sacramento County.

TABLE 15
SPECIAL-STATUS WILDLIFE SPECIES THAT ARE
KNOWN OR HAVE POTENTIAL TO OCCUR IN SACRAMENTO COUNTY (a)

(b)			
Species	Legal Status Federal/State)	Habitats	Occurrence
Valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>)	T/C	Elderberry shrubs in riparian habitats	At least 7 reported sites in Sacramento.
Giant garter snake	C/T	Marshlands, ditches, and adjacent uplands	At least 20 reported sites in Sacramento
American white pelican	-/SSC	Feeds in shallow waters	Migrants occur in spring & early summer
Double-crested cormorant	-/SSC	Nests in trees; forages in water bodies	Year-round resident Nesting sites reported at North Stone Lake.
Bald eagle	E/E	Feeds in winter at lakes	An irregular winter visitor. Nesting sites at Folsom Lake just outside County.
Northern harrier	-/SSC	Dense, tall grasslands or seasonal marsh for nesting; grasslands & marsh for feeding	Beach Lake/Stone Lake & treatment plant breeding areas.
Cooper's hawk	-/SSC	Riparian and oak woodland	Regular migrant and winter resident; breeds in oak woodland of east County and American River.
Swainson's hawk	C/T	Large trees for nesting; alfalfa or hay fields for feeding	Common throughout the County
Peregrine falcon	E/E	Marsh, grassland	Possible irregular migrant.
Prairie falcon	-/SSC	Grassland	Possible irregular migrant and wintering bird.

TABLE 15 (Cont.)
SPECIAL-STATUS WILDLIFE SPECIES THAT ARE
KNOWN OR HAVE POTENTIAL TO OCCUR IN SACRAMENTO COUNTY

Species	Legal Status (Federal/State)	Habitats	Occurrence
California gull	-/SSC	Water bodies	Nonbreeding resident
California yellow-billed cuckoo	C/T	Extensive riparian woodland	No records.
Burrowing owl	-/SSC	Natural or artificial burrows for nesting; grasslands for foraging	Nests at several locations in Sacramento County.
Short-eared owl	-/SSC	Dense grasslands and marshlands	Probable irregular winter visitor.
Willow flycatcher	-/SSC	Willow scrub	Probable migrant.
Purple martin	-/SSC	Riparian woodland	Reported nesting sites found in or near downtown Sacramento
Tricolored blackbird	-/SSC	Emergent wetlands for breeding; marsh and grasslands for feeding	At least 24 reported nesting sites in Sacramento.
Bank swallow	-/T	Riparian river bluffs	Reported nesting site on Cosumnes River near Rancho Murieta.
Longeared Owl	-/SSC	Riparian woodland	Known to nest in Sacramento County.
Black Shouldered Kite	-/P	Grasslands	Roost in Sacramento County.

Notes: (a) Adapted from draft Urban Forest Master Plan, Jones & Stokes Associates.
(b) Legal status abbreviations are: E = Endangered, T = Threatened, C = Candidate for listing, and SSC = Species of special concern.
P = Protected

TABLE 16
Rare and Endangered Plant Species in Sacramento County

<u>Scientific Name</u>	<u>Common Name</u>	<u>Federal</u>	<u>Status State</u>	<u>CNPS</u>	<u>Habitat</u>
Aster chilensis var lentus	Suisun marsh aster	C	--	RE	Brackish marsh
Downingea humilis	Dwarf downingea	--	--	RE	Vernal pools
Gratiola heterosepala	Boggs lake hedgehyssop	C	E	RE	Vernal pools
Hibiscus californicus	California hibiscus	C	--	RE	Freshwater marsh
Lathyrus jepsonii var jepsonii	Delta tule pea	C	--	RE	Brackish marsh
Legenere limosa	Green's legenere	C	R	RE	Vernal pools
Lilaeopsis masonii	Mason's liaeopsis	--	E	RE	Brackish marsh
Orcuttia viscida	Sacramento orcutt grass	E	E	RE	Vernal pools
Orcuttia tenuis	Slender orcutt grass	E	E	RE	Vernal pools
Oenothera deltoides howellii	Antioch dunes evening primrose	E	E	RE	Inland dunes
Plagiobothrys hystriculus	Bearded popcorn flower	C	--	RE	Vernal poools

C = Candidate

R = Rare

E = Endangered

CNPS = California Native Plant Society

Native Wildflowers and Bunch Grass. Native grassland species are of interest primarily because they have been so widely displaced by invasive weeds from the Mediterranean region. Among the common species are perennial bunch grasses such as purple stifa and nodding stifa, pine bluegrass, California melka, small flowered melka squirreltail and wildrye. Though none of these species are rare or endangered, grasslands dominated by these species are rare and considered a significant biological resource.

Extensive farming and grazing in Sacramento have taken their toll on native grasslands. The only reported purple needlegrass community of any significance is a little over 1 acre in size at the South Florin multicultural park site. There, average purple needlegrass cover ranged from 19 to 25%, about the same as for Jepson Prairie grasslands in Yolo County.

Numerous species of native grassland wildflowers exist in Sacramento County. Except for vernal pool areas, staff is not aware of any wildflower assemblages that are noted for their showy displays in Sacramento County. The foothill woodlands along Scott and Latrobe Road are identified by the Open Space Task Force as having spring wildflower displays. The Audubon Society also notes the American River Bluffs above Lake Natoma as having some of the most varied and dense floral displays in Sacramento County.

Oaks. If any one plant species could be said to symbolize the Sacramento Valley, it would be the majestic spreading valley oak. No other tree is so characteristic of the fertile valley and no other approaches it in its unexampled parklike affect on the Valley floor. Favoring deep fertile soils and shallow watersheds, valley oaks are concentrated in riverbottoms of South Sacramento County. The largest stands grow near Elk Grove, Galt, and along natural drainages. Their numbers decrease as one moves eastward from lowland to drier, less fertile foothills.

The blue oak is most common in the dry rocky foothill areas, forming large stands in the Cosumnes-Deer Creek drainage. It is also frequent in the bluffs above the American River, east of Watt Avenue and in Carmichael, Orangevale and Fair Oaks. The majority of interior live oaks, on the other hand, grow along creekways, especially in the northeast County.

VEGETATION TYPES

Detailed evaluations of vegetative cover types include numerous specific classifications. The detailed natural area inventory maps described below will incorporate as many specific vegetative cover types as possible. Discussion here focuses on the major vegetation groupings in Sacramento.

Riparian. Riparian woodlands are widely regarded as the most important wildlife habitat in California. There are the most structurally diverse of all habitats, with trees, shrubs, vines, brush, forbs and emergent vegetation combining to provide a diverse range of microhabitats, nesting sites, cover, and food for a greater variety of species than any other wildlife habitat in the state. This in turn enhances the wildlife value of adjacent habitat types, including agricultural lands. Riparian vegetation also provides shade for aquatic habitats, and helps prevent streambank erosion.

Riparian habitat becomes all the more significant when viewed against the acreage which has been lost over the years. In the Sacramento River Valley only 25,000 acres of an estimated 500,000 acres existing in 1850 remain today. Although the pace of conversion has slowed, hundreds of acres continue to be converted in California every year.

Willow scrub or riparian shrub brush is a successional stage in woodland riparian development characterized by thickets of shrub-form willows, blackberry, wildrose, alder and occasional trees. It varies in composition from one locality to another, reflecting differences in topography, disturbance history, and surrounding vegetation.

Dredger tailings where ponds have formed between the tailing piles support a specialized cottonwood dominated riparian environment of comparatively limited diversity frequented occasionally by duck, deer and other species.

Freshwater Marsh. The second most diverse of wildlife habitats in terms of species supported, freshwater marshes provide unique cover, nesting sites, and feeding habitat for wildlife. Ducks, geese and many waterbirds depend on them for feeding, breeding and nesting. Freshwater marshes in the Central Valley make it a primary wintering area on the Pacific Flyway. Other values include high biological productivity, the continuing source of extensive peat deposits in the Delta, and contributing to water purification by metabolizing excess nutrients and acting as a sediment trap.

In the Delta, freshwater tidal marshes were the dominant habitat prior to reclamation. Today, they are found in small patches and narrow bands throughout the Delta on sand bars, dredge spoil islands, natural meander deposits, around the margins of larger islands and along many miles of waterways at the base of levees where silt accumulates. Tule islands and shrubby marshes are among the marsh types found in the Delta. Depth of water is a key determinant of emergent cover and species association. Typical marshes include a mix of open water and associations of tule and reed grass.

Non-tidal freshwater marshes are usually associated with lake or patches of open water, or streams which have relatively calm patterns of flow and deposition. Usually the underlying soil is high in clay content or underlain by hardpan, and water does not readily percolate downward. Cattails, tules, rushes, sedges, barnyard grass and nutgrass are common, with willow, dogwood, button brush and other shrubs established on high margins of the marsh.

Seasonal Marshes. These marshes are characterized primarily by annual vegetation adapted to a yearly cycle of winter flooding and summer drawdown. Relatively impervious soils are essential to seasonal marshes. They are also important as a feeding and breeding area for wintering and resident waterfowl, water birds and shorebirds. Pheasant also may occur in high numbers. Typical species include watergrass, smart weed, cocklebur, yellow nutsedge, curly dock, and drought-stressed stands of swamp timothy.

Vernal Pools. Vernal pools are a type of seasonal wetland supporting annual grasses and forbs that germinate, grow, and mature during later winter and

early spring. They are unique, complex, and highly specialized ecosystems which have evolved within shallow ephemeral pools located on soils containing near surface hardpan layers. The characteristics and species composition of vernal pools are determined by the underlying geologic formation and associated surface soils. Thus, vernal pools associated with alluvial floodplains low terrace and high terrace land forms each have distinct attributes. Vernal pools sustain a specially adapted flora of approximately 200 species, including some of the state's rarest and most unusual plants. They also provide seasonal wetland habitats for vertebrate and invertebrate fauna, also including rare species.

Oak Woodlands. Oak woodlands are found in the eastern portion of the County in moderate to dense stands comprising blue oak, interior live oak and valley oak. Some California black walnut and cottonwood exist at better locations. This is good habitat for deer, gray squirrels, other rodents and birds, particularly in the vicinity of streams and ponds.

Oak grassland is a transition zone between woodlands and grassland. Majestic valley oaks, outstanding in the field, typify this community.

Grasslands. Generally grasslands are limited to species of annual plants with low wildlife values. Invader species such as rip brome, foxtail brome, wild oats, and star thistle are often dominant. Native perennial bunch grasses, once dominant in the valley grassland ecology, are now limited to occasional clumps, if they are found at all. Species composition is affected by grazing practices. Wildflowers are occasionally numerous, particularly near rock outcroppings and in areas where grazing is light.

With resident animal species limited to rodents, grassland has comparatively lower wildlife values than other cover types. Large expanses of foothill grassland in the east County provide valuable prey area for raptors. Where grassland meets riparian, wetland and woodland habitats, the edge effect created by intermixing species enhances diversity.

Agricultural Lands. Although they are not a natural habitat type, agricultural lands are not without wildlife value. Geese, pheasant, and other species feed on grain crops, and losses are occasionally significant. Agricultural lands can often be managed to enhance wildlife values with minimal crop loss.

FISHERIES

The rivers, streams, and water bodies within or passing through Sacramento County provide an important habitat for a diverse assemblage of fish, including both anadromous and resident species. Anadromous fish include chinook salmon, steelhead trout, striped bass, American shad, sturgeon, and Pacific lamprey. Resident fish can be separated into warm water gamefish (such as large mouth bass, crappie, catfish, bullhead, and sunfish), cold water gamefish (such as rainbow and brown trout), and nongame fish (such as Sacramento squawfish, Sacramento sucker, and carp). However, gamefish consideration could be extended to these nongame species since recent immigrant peoples catch these species for food. Specific population numbers on most species in Sacramento County are currently not available.

The aquatic environment in the County supports tens of thousands of anadromous fish and rear a sizeable amount of both cold and warm water species. However, with expanding development and neglect of the habitat, fisheries have declined. This loss has been generated by habitat destruction, water temperature increases, water diversion, and non-point source pollution runoff. While license fees are increasing, recreational fishers are finding the habitat in shambles and the fishing mediocre. Some waterways are no longer fished because dumping of trash has ruined the natural character and is in the process of destroying the fisheries. To reverse the decline of fisheries the County needs to pursue policy that increases propagation, preserves and protects existing aquatic environments, and expands habitat.

Migratory Species: Chinook Salmon. The migratory species chinook salmon is economically the most important fish in the County. Annual commercial, ocean, and river sport catches of chinook reared in the Lower American River have averaged about 180,000 fish. In addition, approximately 45,000 chinook enter the Lower American during the four annual spawning runs -- fall, late fall, winter, and spring. The fall run in both the American and Sacramento Rivers is the most abundant, comprising approximately 80 percent of the annual migrations. During very wet years a few chinook may also enter the Cosumnes River and Laguna, Deer, and Dry Creeks.

Chinook production is dependent on two sources, hatchery and natural production. The major factors effecting propagation from both sources are habitat availability, water diversion, and water temperature. Diversion of water and dramatic changes in discharge volume and timing have impacted habitat and reduced populations. Spawning habitat in both the Sacramento and American Rivers have been degraded by decreases in gravel shoals due to gravel retention behind upriver dams. Artificially high water temperatures in the Sacramento River and in the American near its confluence with the Sacramento River all but preclude spawning.

Resident Species. The warm water species prefer the vegetated shoreline areas where current velocity is low and cover is available. Shaded riverine aquatic habitat provides essential spawning cover for most warm water fish, including largemouth bass, bluegill, green sunfish, and crappie. Lower segments of the Cosumnes River and Dry Creek also support bullhead, Sacramento squawfish, Sacramento sucker, threadfin shad, and carp.

Warm water fisheries also exist along the canals and drainages in the County. Canals typically contain the same species found in the adjacent river. Some spawning occurs in canals, but population levels are maintained primarily through fish passage. Many species do quite well in canals that are not chemically treated or emptied of water.

The Delta and associated sloughs, along the southwestern reaches of the County, provide habitat for many warm water fish and functions as a nursery area for many migratory species. Much of the County fish stock, including striped bass and shad, depend directly on the slow moving, nutrient rich waters of the Delta.

Fishing. The most popular sport fisheries are the anadromous fish; chinook in the fall, steelhead trout in winter, and shad in late spring. These are large fish that arrive by the thousands. Sport fishing of resident species, although not as popular, does attract many recreationists. Resident species are also a major component in the predator - prey relationship with the anadromous species and are vital in maintaining the ecological character of County waterways.

Hatcheries. There are two active fish hatcheries in the County. One along the American River at Nimbus Dam produces salmon and steelhead. The second facility in Elk Grove produces warm water fisheries. Hatcheries have supplemented natural propagation; however such facilities while increasing the population, do nothing for habitat, and arguably increase mortality. Hatcheries are also an expensive way to produce fish, averaging as much as two dollars per pound.

HABITAT MAPPING

The Open Space Task Force specifically requested that the Planning Department inventory and map natural areas in Sacramento County. The Planning Department does not have sufficient staff or expertise to properly undertake a full inventory. However, there exists a number of vegetative cover data sources, including the U.S. Fish & Wildlife Service wetlands inventory maps, the Delta Atlas, riparian vegetation maps, the Natural Diversity Database, and recently prepared vegetation maps for the floodplain within the scope of the Army Corps of Engineers current flood control studies of the American and Sacramento Rivers. Staff intends to simplify and combine this data on 7-1/2 minute topographic quadrangles.

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VII

D. VEGETATION AND WILDLIFE RESOURCES
BACKGROUND REPORT

3. NATURAL AREAS OF SPECIAL SIGNIFICANCE

This section identifies specific areas of the County which have special natural resource values. We have identified those areas which have been singled out by resource conservation agencies and private groups. Comments and descriptions are drawn from sources cited. The list is not all-inclusive, nor is there unanimous agreement on the significance of all areas. A map identifying natural areas of special significance will be available at the Board Workshop on August 8, 1989. An asterisk indicates all or a major part of the area is in public or quasipublic ownership.

MOKELUMNE/COSUMNES DRAINAGE

1. Lower Cosumnes River

Location: From junction of Cosumnes River and Cosumnes River Overflow (1 mile west of Dillard/99 Jcn) to confluence with Mokelumne. Includes Badger Creek from Cosumnes confluence to Highway 99.

Comments: Support more than 100,000 waterfowl; sandhill crane here; important and unique natural area; variety of hydrological conditions in small area at merging of Valley River and Delta systems; undammed, represents unaltered valley ecosystem; system of sloughs and marshes each slightly different in its ecological balance; intermixing of habitats enhances ecological diversity.

Sources: Cosumnes River Basin Resource Study identifies as a critical natural resource conservation area. The Study recommends the area from Twin Cities Road to the Mokelumne confluence as an ecological preserve. Identified as a significant resource area in the Delta Wildlife Protection Plan. Within this area the following are singled out by additional sources.

a. Cosumnes/Mokelumne Confluence Valley Oak Riparian Forest.*

Location: North and east of Mokelumne at confluence with Cosumnes.

Comments: Considerable microtopography; high water channels and intervening sand and silt bars; national natural landmark designation; state designated significant natural area.

Source: Fish and Game California Natural Areas Program.

b. Cosumnes Valley Oak Riparian Forests.

Location: Vicinity of confluence with Grissley and Bear Sloughs, and between 1/2 and 1-1/2 miles upstream from confluence.

Comments: Diverse forest of valley oak, cottonwood and ash dominated by oaks; outstanding example of valley oak forest; well balanced population of all diameters; many sloughs cut forest; excellent oak reproduction; national natural landmark designation; state designated significant natural area.

Source: Fish and Game California Natural Areas Program.

2. Deer Creek - Cosumnes Riparian Corridor

Location: From El Dorado County line to confluence of Cosumnes River and Cosumnes River Overflow.

Comments: Good riparian woodland cover along most of both banks of both water courses; occasional clear spots; generally is narrow band along each watercourse, occasionally widens to hardwood forest in valley portion.

Sources: Cosumnes River Basin Resource Study identifies as a resource conservation area; Open Space Task Force recommends an open space corridor to protect wildlife habitat. Within this area the following area is singled out by additional sources.

a. Lower Deer Creek

Location: Along Deer Creek 1 mile northeast of confluence with Cosumnes River between Grant Line Road and Dillard Road.

Comments: Grazing maintained savanna with valley oaks; Swainson's hawk observed; wetlands, riparian and valley oaks amid valley grassland; wildlife extremely plentiful; State designated significant natural area.

Sources: Fish and Game California Natural Areas Program; Audubon Society area of critical concern.

3. Badger Creek

Location: East of Highway 99 just south of Dillard Road interchange, including Badger Creek and North Fork Badger Creek extending just past Riley Road.

Comments: Wetlands, riparian and valley oaks amid valley grassland. Excellent example of historical Sacramento Valley habitat. Especially scenic from Highway 99.

Sources: Proposed natural resource conservation area in Cosumnes Basin Resources Study; Audubon Society area of critical concern; Open Space Task Force recommends high priority for open space preservation.

4. Lower Mokelumne, Dry Creek, Grissley and Bear Sloughs

Location: Mokelumne River from 1/2 mile east of Cosumnes confluence eastward to Dry Creek confluence; Dry Creek from Mokelumne confluence eastward four miles; Grissley Slough between Cosumnes River and Dry Creek.

Comments: Riparian vegetation along all water courses; excellent grassland, riparian, woodland mix along Bear Slough; some of grassland and woodland along Mokelumne has been leveled since 1973.

Sources: Cosumnes River Basin Resources Study identified as a critical natural resource conservation area; identified as a significant resource area in Delta Wildlife Protection Plan; Grissley Slough included as part of Cosumnes riparian corridor by Open Space Task Force.

5. Mokelumne River

Location: North bank between Franklin Boulevard and New Hope Landing.

Comments: Riparian vegetation on levee side of river.

Source: Identified as significant resource area in Delta Wildlife Protection and Restoration Plan.

6. Dry Creek

Location: North bank, Amador County line to point four miles east of Mokelumne confluence.

Comments: Riparian corridor occasionally widening to woodland areas.

Source: Identified as Dry Creek riparian corridor by Open Space Task Force.

7. Laguna Creek

Location: From one mile west at Clay Station Road at Hobday Road extension to confluence with Cosumnes River.

Comments: Intermittent stream with riparian habitat; two miles of riparian woodland with large trees; lower reaches include seasonal marsh along creek and tributaries.

Sources: Identified as Laguna Creek riparian corridor by Open Space Task Force. The western reach, upstream 1-1/2 miles from Cosumnes confluence is included within critical natural resource area identified by Cosumnes River Basin Resources Study.

STONE LAKES/DELTA

1. Beach Lake/Morrison Creek*

Location: Northern portion Regional Treatment Plant property between I-5 and Union Pacific Railroad.

Comments: Permanent and seasonal marsh in what used to be Beach Lake; riparian forest along Morrison Creek, essentially intact since 1937, dominated by cottonwood and willow; a riparian area abundantly rich in wildlife and plant communities.

Sources: The draft master plan for buffer lands designates the area as a natural area; Audubon Society area of critical concern; identified as open space for winter waterfowl by Open Space Task Force.

2. Lower Laguna Creek*

Location: Between Franklin Boulevard and Union Pacific Railroad tracks on Regional Treatment Plant property.

Comments: Seasonal wetland, ponds and vernal pools with adjacent grassland; channel modifications in conjunction with upstream improvements along Laguna Creek.

Source: Draft Master Plan for buffer lands designates the area as a natural area.

3. North Stone Lake*

Location: Morrison Creek levee on north, I-5 on east, Hood-Franklin Road on south and Southern Pacific Railroad on west.

Comments: Extremely high fish and wildlife values; old overflow basin with diversity of habitat; 464 acres emergent marsh 155 acres riparian, 170 acres water, 2,158 acres upland; supports excellent warm water fishery; high diversity of vegetation types makes area one of most unique and valuable in Sacramento Valley. Large rookery on southeast arm is largest in County; vital link in Pacific Highway; number one ranked site for new western national wildlife refuge.

Sources: U.S. Fish and Wildlife Service report to Corps on Morrison Creek Project; Audubon Society area of critical concern; identified as significant resource in Delta Wildlife Protection and Restoration Plan; Open Space Task Force wildlife protection area.

4. South Stone Lake

Location: Hood-Franklin Road on north, I-5 on east, Lambert Road on south and Southern Pacific Railroad on west.

Comments: Includes 93 acres riparian, 446 acres marsh, 186 acres upland, 121 acres water; rest of 3,480 acres is agriculture; supports excellent warm water fishery; supplements North Stone Lake as important wildlife area; part of number one ranked site for new western National Wildlife Refuge; with North Stone Lake, is one of the most important ecological complexes in Delta.

Sources: U.S. Fish and Wildlife Service report to Corps on Morrison Creek Project; designated significant resource on Delta Wildlife Protection and Restoration Plan; Open Space Task Force wildlife protection area.

5. Snodgrass Slough

Location: Length of slough, between Sacramento River and Delta Meadows.

Comments: Shrub brush and occasional riparian woodland along northernmost Delta slough in Sacramento.

Source: Significant resource in Delta Wildlife Protection and Restoration Plan.

6. Delta Meadows*

Location: Between Locke and Walnut Grove.

Comments: Significant prime natural resource area; remnant of valley oak woodland; in excess of 110 bird species, abounds with small mammals; state park acquisition project.

Source: Audubon Society area of critical concern.

7. Lost Slough

Location: Union Pacific Railroad tracks east to Sacramento River, just north of Delta Meadows.

Comments: Waterway and adjacent riparian habitat linking Lower Cosumnes and Delta Meadows, Snodgrass Slough and the Delta river system.

Source: Identified by Open Space Task Force as natural area to protect as open space.

8. Steamboat Slough

Location: Entire length.

Comments: Riparian shrub-brush and woodland at south end near Howard Landing and along north portion.

Source: Significant resource in Delta Wildlife Protection and Restoration Plan.

9. Grand Island Tip

Location: West end Grand Island at mouth of Steamboat Slough.

Comments: Mason's lilaeopsis, Delta tule pea, and Sacramento anthacid beetle found here; state designated significant natural area.

Sources: Fish and Game California Natural Areas Program; significant natural resource in Delta Wildlife Protection and Restoration Plan.

10. Georgiana Slough

Location: Walnut Grove to Isleton.

Comments: Shrub-brush and occasional woodland riparian along open slough.

Source: Identified as riparian open space corridor by Open Space Task Force.

11. Seven Mile Slough

Location: Brannan Island State Park east to San Joaquin River.

Comments: Riparian trees and shrub-brush along a little-used slough.

Sources: Significant natural area in Delta Wildlife Protection and Restoration Plan; designated natural area in Delta Master Recreation Plan.

12. Brannan Island*

Location: South end Brannan Island at State Park.

Comments: Site of Antioch Dunes evening primrose, very rare plant; state designated significant nature area.

Source: Fish and Game California Natural Areas Program.

13. Mayberry Slough

Location: Southwest end of Sherman Island.

Comments: Deadend slough, isolated for wildlife habitat.

Source: Natural area recommendation of Open Space Task Force.

14. Southwest Tip of County

Location: Tip of Sherman Island.

Comments: Upland habitat; blue heron rookery; several rare and endangered species.

Sources: Delta Wildlife Protection and Restoration Plan; recommended natural area open space by Open Space Task Force.

15. Chain Island

Location: Westernmost point of County.

Comments: Isolated island, formerly diked with coastal brackish marsh habitat; Mason's lilaeopsis and Suisun marsh aster; state designated significant natural area.

Source: Fish and Game California Natural Area Program.

EASTERN SACRAMENTO COUNTY

1. Upper Laguna Creek

Location: Upstream from Sheldon Road for one mile.

Comments: Dense stand of riparian vegetation listed as one of three most important sections on Laguna Creek (the other two are now urban creek sections).

Source: U.S. Fish and Wildlife Service report to Army Corps on Morrison Creek Project.

2. Sloughhouse South

Location: Uncertain.

Comments: One of best sites of valley elderberry longhorn beetle habitat; state designated significant natural area.

Source: Fish and Game California Natural Areas Program.

3. Meiss-Ione Road Overlook

Location: Four miles southeast of Bridgehouse just south of Meiss Road and west of Ione Road.

Comments: Only lesser nighthawks in Sacramento County; vernal pools with unusual dwarf plant.

Sources: Audubon Society area of critical concern; natural area recommendation by Open Space Task Force.

4. Scott Road Raptor Area

Location: Between Cosumnes River, Latrobe Road and Grant Line Road; approximately 80 square miles including El Dorado County portion.

Comments: Open shortgrass prairie with sparse to dense valley and blue oak thickets, mostly in southern area; dense cottonwood-willow riparian vegetation along stream courses; habitat for one of largest concentrations of raptorial birds in Sacramento region; grand wildflower displays in spring.

Sources: Audubon Society area of critical concern; natural area open space recommendation by Open Space Task Force.

5. Sloughhouse Vernal Pools

Location: East and southeast side of Grant Line Road between one and six miles north of Highway 16.

Comments: Concentrations of vernal pools; very rare Sacramento orcutt grass found near County dump; state designated significant natural area.

Sources: Fish and Game California Natural Areas Program; Audubon Society area of critical concern.

6. Rancho Seco Lake*

Location: one half mile south of Rancho Seco Lake.

Comments: About 500 plants of Sacramento orcutt grass; state designated significant natural area.

Source: Fish and Game California Natural Areas Program.

7. Jackson Highway Oak Woodland

Location: South of Jackson Highway between Ione Road and Amador County line.

Comments: None.

Source: Natural area recommendation of Open Space Task Force.

8. Twin Cities Road Oak Woodland

Location: Both sides Twin Cities Road and Amador County line.

Comments: None.

Source: Natural area recommendation of Open Space Task Force.

9. South Area Vernal Pools

Locations: The following descriptions generally define where the densest concentration of vernal pools occur in Sacramento County in addition to those sites identified above. The list is not all inclusive.

- North side Douglas Road one mile east of Sunrise
- East side Sunrise Boulevard north of Kiefer Road
- Lower 1/2 of triangle formed by Sunrise, Highway 16 and Grant Line Roads
- Both sides Meiss Road, three miles east of Dillard Road
- East side Clay Station Road south of Laguna Creek
- Both sides Riley Road between Arno and Salas Roads
- Between Clay Station Road/Laguna Creek and Alta Mesa Road one mile south of Tavernor and north of Salas Road extension
- Along three mile wide corridor flanking railroad tracks north of Twin Cities Road, extending from Southern Pacific RR tracks east to County line. Located in 50 to 300 acre groups of densely occurring vernal pools.

Comments: Quality of pools is unknown; may contain rare and endangered plants.

Source: Map prepared by Robert Holland in 1983 based on aerial photo interpretation.

NORTH SACRAMENTO

1. Garden Highway

Location: Sacramento River from Interstate-80 north to County line.

Comments: Greatest concentration of riparian woodland in Sacramento County along Sacramento River; riparian woodlands are seven times greater in extent than disturbed rip-rap areas to south; coexists with several homes; Swainson's hawk nests.

Source: Sacramento Marina Carrying Capacity Study.

2. Alder Creek

Location: Aerojet property paralleling U.S. Highway 50.

Comments: Excellent riparian area; diverse vegetation and wildlife; spillway and marsh; upstream ponds add diversity; good beaver and muskrat habitat.

Sources: Audubon Society area of critical concern; Open Space Task Force recommended natural area.

3. Fair Oaks Bald Spot*

Location: Phoenix Park in Fair Oaks.

Comments: Excellent examples of vernal pools with Sacramento orcutt grass; state designated significant natural area.

Sources: Fish and Game California Natural Areas Program; Audubon Society area of critical concern; Open Space Task Force recommended natural area.

4. Lake Natoma*

Location: East of Hazel Road on American River.

Comments: American River bluffs, 100 feet high, cut by several small canyons; rich foothill woodland plant community; some of most varied and dense floral displays in Sacramento County; cottonwood dredger tailing riparian at Negro Bar with jungle-like mixture of oak, buckeye, elderberry, et al on higher ground.

Source: Audubon Society area of critical concern.

5. East Main Drain*

Location: Northern city limits to Sutter County line.

Comments: Waterfowl habitat; year round habitat; much disturbance, dumping.

Source: Open Space Task Force recommended wildlife habitat and natural area.

6. Dry Creek*

Location: Sutter County line south to Rio Linda Community Park, including both channels and Cherry Island in between.

Comments: Dual channel with grassland/farming in between creates good wildlife habitat. Good riparian cover along creek channels.

Source: Additional areas recommends for purchase by County Parks using Proposition 70 funds designated for purchase of riparian corridors.

7. American River Parkway*

Location: Hazel Avenue west to Sacramento River.

Comments: Mix of riparian, freshwater marsh, oak woodland, grassland, inhabited by great variety of plant and wildlife species.

Source: American River Parkway Plan.

SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VII

D. VEGETATION AND WILDLIFE RESOURCES
BACKGROUND REPORT

4. RESPONSIBILITIES AND CURRENT EFFORTS

Most levels of government, as well as in the private sector, play an active role in protecting vegetation, wildlife, and natural areas. The following summarizes key responsibilities and current efforts.

U.S. ARMY CORPS OF ENGINEERS

Wetlands Regulation. The primary federal regulation protecting wetlands is Section 404 of the Clean Water Act. Section 404 regulates discharge of dredged or fill material into waters of the United States, including most wetlands. Section 404 is administered jointly by the U.S. Army Corps of Engineers (COE) and the U.S. Environmental Protection Agency (EPA). The U.S. Fish and Wildlife Service and the National Marine Fisheries Service have advisory and commenting roles in the 404 process.

The COE has jurisdiction over waters of the United States. Such waters are referred to as jurisdictional wetlands and are defined as those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. To be regulated by the COE wetlands must meet a three-parameter test by having 1) a predominance of plants determined to be "obligate wetland," "facultative wetland," or "facultative" species; 2) indicators of wetland hydrological conditions, such as inundation, saturation, drift lines, watermarks, sediment deposits, or drainage patterns in topographically low sites; and 3) indicators of hydric soil conditions, such as highly organic surface layers, hydrogen sulfide emissions, shallow groundwater, reducing soil chemistry, gray soil colors, bright mottles in a dark matrix, and iron-manganese concretions.

Obligate wetland plants are species "that occur almost always (estimated probability greater than 99 percent) in wetlands under natural conditions." Facultative wetland plants are species "that occur usually (estimated probability 67-99 percent) in wetlands." Facultative plants are species "with a similar likelihood (estimated probability 33-67 percent) occurring in both wetlands and nonwetlands."

Section 404(b)(1), a subsection, requires that practicable alternatives be considered before a permit can be issued to discharge dredged or fill material into wetlands. Practicable alternatives are presumed to exist for uses that are not water dependent. The COE applies the (b)(1) guidelines and its own public interest review to individual permit applications. Public interest review includes considering aesthetics, conservation, economics, general

environmental concerns, wetlands, flood hazards, historic properties, fish and wildlife values, land use, navigation, shoreline erosion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people. Economic hardship is considered a valid reason for permit issuance.

Local governments can participate in the COE permitting process through the notice and comment procedures for permit applications. They can monitor activities in wetland areas and report unauthorized filling or dredging. The COE prefers to conduct evaluations of permit requests simultaneously with local permit review, whenever possible. If local permits are denied within 30 days of the issuance of a public notice, the COE will usually deny the requested Section 404 permit.

Certain activities are specifically exempt from 404 regulations. Exemptions include normal farming, silvaculture, and ranching activities; the construction or maintenance of farm or stockponds, or irrigation ditches; and the construction of farm or forest roads. These exemptions are subject to the so-called "recapture" provision that negates the exemption for the activities listed if the purpose of the activity is to bring an area of navigable waters into a new use--one that either impairs the flow of waters or reduces their extent.

To facilitate the regulatory process governing wetlands of relatively small size, ten acres or less, the COE will issue a Nationwide General Permit, referred to as Nationwide 26, to an applicant seeking to fill up to ten acres of wetland under a single development proposal. The issuance of a Nationwide permit for filling one to ten acres typically allows mitigation which results in a net loss of wetland. For wetland loss under one acre the Corps will issue the permit and may require no mitigation.

Streambank Protection. Ironically, while the COE is charged with protecting wetlands, its traditional responsibility is flood control which has led to the loss of thousands of acres of natural habitat. In Sacramento, their efforts concern levee protection and stabilization along the Sacramento River.

Since 1960, Congress has authorized a total of 158 miles of bank protection under the first two phases of the Sacramento River Bank Protection Project. About 138 miles of this work have been completed and about 20 more miles are scheduled for completion by 1991. After 1991, the third phase of the project, covering a substantial additional length of riverbanks, will likely be initiated. Usually, from one to three construction contracts are issued each year. Each contract generally comprises 10 to 25 individual sites which total at least several miles in length.

As each new levee contract is completed, a substantial part of the river's remaining riparian cover is permanently removed. In the past, the COE has offered replacement mitigation. Presently, replacement efforts by the Corps are limited to, at best, a few hundred linear feet annually of experimental mitigation measures. The experimental measures are designed primarily for replacing the habitat values for juvenile salmon. Specific replacement for other fish and wildlife is secondary.

OTHER FEDERAL AGENCIES

U.S. Fish and Wildlife Service. The Fish and Wildlife Service manages the National Wildlife refuge system, operates or participates in several wildlife habitat preservation programs, undertakes wildlife studies in conjunction with environmental analysis of federal projects, oversees the Endangered Species Act, and advises the COE on 404 permit applications. The Service operates under a no net wetlands loss policy with regard to its recommendations to the Corps of Engineers and involvement in federal projects

The Service has approved the Stone Lakes National Wildlife Refuge for Sacramento County. However, due to funding constraints and some property owner opposition refuge establishment has been delayed. Fish and Wildlife staff plan to begin restoration of some sections of the project area within the coming months. The project include Beach Lake Preserve, the Regional Sanitation buffer lands, and North and South Stone Lakes.

U.S. Soil Conservation Service. The purpose of the Soil Conservation Service (SCS) is to develop and implement individual soil conservation plans with participating landowners. The SCS also assists local Resource Conservation Districts to develop long-term soil and water conservation programs. The SCS is the only agency that inventories, assesses, and monitors soil resources on a significant scale.

The SCS carries out federal policy on agricultural conversion of wetlands under the 1985 Food Security Act. The act included the "swampbuster" provision that denies all federal farm benefits, mortgages, commodity support, and crop disaster loans to farmers or other persons converting wetlands to dry cropland after December 1985. The SCS identifies and maps all wetlands on property for which landowners submit applications for federal benefits. In Sacramento County, wetlands covered by the Swampbuster provision are located primarily in the lower Cosumnes and the Delta and do not constitute a significant percentage of the wetlands acreage.

Other Federal Agencies. The Bureau of Land Management owns property in the Cosumnes River area and is a cooperator within the Nature Conservancy's Cosumnes River Preserve. There are no Forest Service holdings in the County. Department of Defense property at Mather Air Force Base includes a 67-acre wetlands area known as Mather Lake as well as several vernal pool complexes. The County Parks Department is proposing that the wetlands area be part of a regional park when Mather closes. The Bureau of Reclamation owns land around Lake Natomas comprising bluffs, oak woodland, grassland, and some wetlands which are managed by the state as part of Folsom State Park.

STATE AGENCIES

Department of Fish and Game. As California's principal agency protecting wildlife, Fish and Game operates programs to protect rare and endangered species, preserve valuable wildlife habitat and manage wildlife resources on public lands. The Department operates the hunting licensing program and employs wardens throughout the state to enforce hunting laws and minimize

wildlife depredation. The Department also licenses several pheasant hunting clubs in Sacramento.

Fish and Game also issues streambed alteration permits which are required of any person or agency undertaking any work within the mean high-water mark of any body of water containing fish or wildlife resources or where the project sponsor will use material from the streambed. The permit imposes such conditions as necessary to protect the fish and wildlife resources or where the project sponsor will use material from the streambed. The permit imposes such conditions as necessary to protect the fish and wildlife resources of the site. Permits involving development projects are usually processed after local approval.

In addition to its regulatory responsibilities, Fish and Game reviews and recommends modification, approval, or denial of projects requiring a County permit that may affect wildlife.

Department of Water Resources. Water Resources is currently purchasing most of Twitchell Island and some of Sherman Island. Although habitat restoration plans are complete, there is no schedule yet for implementation. Current efforts are replacing row crops for pasture land to minimize tillage which aggravates soil oxidation. The pastures will provide some wildlife foraging opportunities.

Department of Parks and Recreation. The state parks system includes Folsom Lake, Delta Meadows, and Brannan Island with natural habitat lands. The Department does not anticipate additional recreation development which would encroach upon natural areas.

LOCAL AGENCIES

Sacramento County Parks and Recreation Department. The American River Parkway is the jewel of the County's park system, and recognized nationally as an outstanding example of a local effort to protect a major riparian environment throughout its length. The Parkway receives heavy recreational demand which must be balanced with wildlife protection imperatives. The Department is guided in its management and development of the Parkway by the American River Parkway Plan, an element of the County General Plan. The Plan establishes 80 percent of the Parkway as a natural area.

Outside of the American River, the Department has focused primarily on providing regional recreation facilities. Gibson Ranch Park includes riparian woodland on both sides of Dry Creek. A draft Dry Creek Master Plan has been released which includes a linear trail following the creek. In the south County the Department has begun development of a multicultural park. A Master Plan for this site, which has over 70 vernal pools, has also been released.

The Parks Department recognizes the need for its more active role in natural area acquisition and management. The Parks 2000 Plan establishes that "provision of a sufficient quantity of high quality conservation oriented regional open space shall be a major mission of the department."

Sacramento County Department of Environmental Review and Assessment (DERA). All projects to which CEQA applies are reviewed by DERA for possible impacts on vegetation and wildlife. Projects where aerial photos and field inspections by DERA staff indicate probable wetlands are surveyed by a professional botanist for the presence of rare and endangered plants. The Environmental Coordinator determines if the project will have significant affect on vegetation and wildlife resources and recommends appropriate mitigation measures.

Public Works Tree Coordinator. The Tree Coordinator, a position with the County Department of Public Works, is responsible for administration of the Tree Preservation Ordinance and all tree mitigation measures incorporated as conditions to discretionary projects. The ordinance protects all oak trees unless they are specifically designated for removal as part of an approved project. When oaks are removed they must be replaced with the same tree species equaling in sum the diameter of the tree lost. Any person may pay a fee of \$60.00 per inch diameter to remove oaks when their replacement is not possible due to site constraints. The Tree Preservation Ordinance applies only to the designated urban area, except for projects that require a discretionary land use entitlement, such as a parcel map.

The Tree Coordinator advises DERA staff in developing recommended native oak tree mitigation measures. Other responsibilities include reviewing improvement plans and building permits and ensuring that project proponents comply with required conditions of approval.

The Coordinator has the authority to issue "stop work orders" on projects in violation of required mitigation measures. In extreme cases, where project implementation results in the willful destruction of native oaks, again in violation of required mitigation, the Coordinator can recommend the revocation of the project's land use entitlement by referring the project proponent back to the original hearing body.

Regional Sanitation District. The Sacramento Regional County Sanitation District manage a 2,650-acre buffer area surrounding its regional treatment plant near Freeport. The buffer lands include 556 acres of wetlands, riparian forest, willow scrub and vernal pools and an additional 896 acres of grassland. The District has completed a draft Master Plan for the buffer lands which identifies natural areas for protection and restoration.

A supplement to the plan notes the buffer lands' potential to be part of a new federal wildlife refuge. The supplement also explains increasing interest by local developers and environmental organizations in managing buffer lands as a mitigation bank site for wetlands. The District will not undertake new long-term leases or other land use commitments until the status of the refuge and its future management become clear.

Private Organizations. The Nature Conservancy and Ducks Unlimited are both private, nonprofit agencies dedicated to preserving natural habitat nationwide. Nature Conservancy's mission is to preserve the full array of biological diversity by finding, protecting, and preserving the best examples of ecosystems, communities, and important species in the natural world. Ducks

Unlimited seeks to conserve wetland habitat for waterfowl and other wildlife. They also use satellite imagery and computers to evaluate, inventory, and map wetlands important to migratory waterfowl.

In Sacramento, the Nature Conservancy owns and jointly manages the 5,000 acre Cosumnes River Preserve with Ducks Unlimited, the Bureau of Land Management, State Fish and Game, and County Parks. This joint effort, one of several nationally significant projects undertaken by the Nature Conservancy, will protect a prime habitat for California's migrating waterfowl. As part of the overall project the Nature Conservancy will restore riparian forest and wetland on what is currently levelled agricultural land. The revegetation project will be conducted with controlled scientific experiments. The two conservation agencies are currently negotiating additional purchases in the lower Cosumnes River. The Nature Conservancy is also evaluating the natural values of the the South County east of Highway 99 to determine if additional projects in Sacramento merit consideration.

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SACRAMENTO COUNTY GENERAL PLAN
CONSERVATION ELEMENT

SECTION VII

E. CULTURAL RESOURCES

INTRODUCTION

Sacramento County is fortunate to have a rich and varied collection of historic and prehistoric features which serve as a record of significant, as well as routine, events in the County's long history of human habitation. Exemplary archaeological sites of Nisenan-Maidu and Plains Miwok Indians have been identified along river terraces. Their locations are fiercely protected by researchers who feel, without protection, the sites would be disturbed if the locations were disclosed. The history of more recent settlers in the County is seen at the Historic sites and structures of explorers and settlers who came to trap, mine, and farm. The area's wealth in fur, gold, and soil drew settlers of diverse ethnicities and cultures including, Asians, Hispanics, African Americans, and Europeans whose cultural imprint can be found throughout County neighborhoods.

THE RESOURCE

The evidence left by prehistoric ancestors in what is now the vicinity of Sacramento County is often difficult to detect. Most artifacts of prehistoric peoples were made of natural materials, stone, fur, sticks, grasses, and mud which rapidly return to the earth. However, due to the length of habitation and the abundance of food Sacramento County has a rich array of important archaeologic sites where many artifacts have been recovered. An array of hand implements, middens rich in discarded objects, isolated field houses, and mud, stick, and stone structural remains of entire villages comprise some of the County's cultural resource heritage. Trained and locally experienced archaeologists decipher the relationship these artifacts have to one another in hopes of understanding, among other things, food gathering practices, societal structuring, and trading networks.

Archeologic sites are especially important to Native American Indians as such sites represent a significant part of their ancestral heritage. Consultation with Native American Indians has proven valuable in helping to discover, protect, and interpret many County archaeological sites.

More recent historical sites involve settlers from Europe, Asia, Spanish holdings in South America, and other areas of the world. Comparatively fewer historic sites remain due to continual changes to the area caused by successional use. In addition, Sacramento County is the center of many interesting and important events which are historically significant, including the Gold Rush, the development of railroads, the seat of State Government, and as a major shipping port for the Central Valley's products. A variety of sites and artifacts have been preserved representing a wide array of cultural and historical events that have occurred in the County. Among the most prominent

the Old Town Sacramento, the Capitol, Sutter's Fort, City of Folsom, and many structures with cultural, historical, or architectural significance.

LOCATION

Both historic and prehistoric sites tend to be scattered throughout the County, although both can potentially be found in greater concentration along waterways. Areas that are likely or extremely likely to contain prehistoric sites include the Cosumnes River area, the American River area, and the Delta and Sacramento River areas (Figure 12).

Historic sites tend to be concentrated in areas still inhabited such as the City of Sacramento, City of Folsom, the Delta, along old travel routes like the Jackson Highway, Central California Traction Railroad, and Southern Pacific Railroad routes and along river and stream beds.

ISSUES FACING CULTURAL RESOURCES

It is important to define, protect, and preserve our cultural resources for future generations and to provide continuity between past and present. There are four general areas where cultural resources face problems. These are: 1) Lack of systematic methods for locating, reporting, and recording sites or storing excavated cultural artifacts, 2) Numerous agencies and interest groups are, at times, seemingly unable to reach a consensus on "significant" site definition or appropriate mitigation measures, 3) Lack of adequate protection through either public or private ownership leads to site disruption from illegal collecting, vandalism, or uninformed usage, 4) Lack of funding for protection and preservation. Each of these issues are discussed below.

1. LACK OF SYSTEMATIC METHODS FOR HANDLING CULTURAL RESOURCES

The possibilities for losing cultural resources are very high because no systematic plan for future exploration for new sites has been implemented. In addition thorough and uniform reporting methods and catalog and storage procedures have yet to be established. Resource losses occur through degradation from weathering, incompatible land uses, and removal of artifacts by collectors. Once archaeological or historic sites are destroyed, there is no way to restore their scientific value. If the site was unknown to archaeologists and historians before its destruction, the link with the past is completely lost.

Previously located and excavated archaeological sites are largely undocumented because many earlier archaeological surveys provided inexact locations of excavations. In addition, early pioneers and mission priests who recorded significant events mention the names of Native American Indian villages, but locations were not specifically described. As a result, information contained in early documentation of some of Sacramento's 400 sites is questionable.

Currently, the California Archaeological Inventory (CAI) acts as the major clearinghouse for archaeological and historic information. CAI compiles all site information onto U.S.G.S. 7-1/2 minute topographic maps and maintains

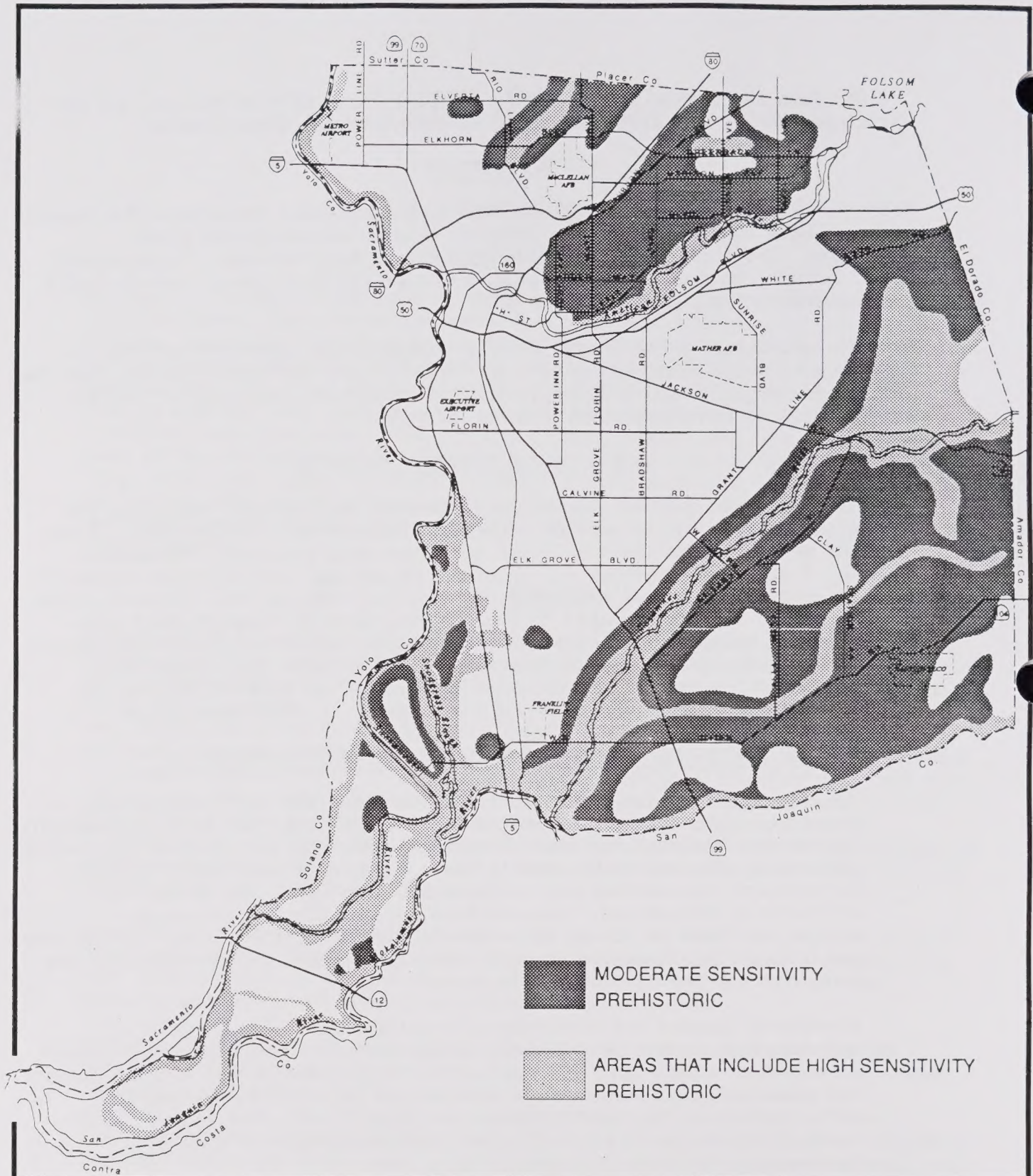


Figure 12
Cultural Resources Sensitivity

Prepared by the Sacramento County Planning and Community Development Department

pertinent data using personal computers. The County Department of Environmental Review and Assessment (DERA) staff uses these maps to refer projects planned in culturally sensitive areas to CAI for data review and possible field and site survey recommendations. The maps and data base represent a guide only, not a comprehensive inventory, unmapped sites can only be located through field investigations. If the CAI's review finds positive site location DERA, will field check the area for archaeological features. The State Office of Historic Preservation (OHP) does some review also, but only for federally funded projects.

Records on local resources are also kept by several other agencies. The California Native American Heritage Commission (NAHC) catalogs traditional and sacred lands used by California Indians in prehistoric and historic times. The Sacramento Museum and History Division collects and catalogs historical records and photographs of local significance and surveys historic buildings. Lastly, the Office of Historic Preservation conducts surveys of historic properties and nominates cultural sites to the National Register of Historic Places and to the State Registry.

Storage of Artifacts

Existing facilities for artifact storage are insufficient. Neither California State University at Sacramento (CSUS), University of California at Davis (UCD), or the State Indian Museum are accepting new artifacts for their collections. Therefore, new materials collected for scientific research are stored uncataloged in basements and garages of archaeologists, where artifacts are unavailable to other researchers and subject to potential damage in an uncontrolled environment. Moreover, the provisions of the California Environmental Quality Act (CEQA), together with continuing urban expansion in archaeologically sensitive areas is yielding an ever-increasing inventory of excavated materials.

Limited storage facilities for historical artifacts have led to similar problems. The Sacramento History Museum and other sites like the Governor's Mansion and Sutter's Fort have only limited storage, catalog, and display space. Some historical artifacts are extremely fragile such as photos, diaries, other written materials, and textiles. Without proper preservation, many such items deteriorate rapidly and so become lost for future reference and appreciation.

2. LACK OF CONSENSUS AND COORDINATION AMONG NUMEROUS AGENCIES AND INTEREST GROUPS

There are a total of ten different public agencies and interest groups involved with preserving historic resources (see Table 17), not including the many consultants who conduct archaeologic and historic research, surveys, and excavations. These groups often have different preservation strategies and priorities. While formal coordination between some groups--County ERA and CAI--is good, most rely on informal communication. No central agency monitors all the various programs and activities.

TABLE 17

AGENCIES AND INTEREST GROUPS

<u>AGENCY</u>	<u>TYPE</u>	<u>FUNCTION</u>
State Office of Historic Preservation (OHP)	State	Nominates cultural sites to the National Register of Historic Places and the State Register. Has prepared and implemented a comprehensive Statewide Preservation Plan. Reviews Federally funded projects only.
California Native American Heritage Commission (NAHC)	Interest Group	Catalogs traditional and sacred land uses of California Indians. Have the authority through the State Attorney General to identify and preserve access to State lands which are religiously or socially significant to Native Americans. Reviews and comments on Environmental Impact Reports which affect property in the sacred lands inventory. If Native American Indian burial remains are found, the NAHC acts as a liaison between descendents and the developer.
California Archaeology Inventory (CAI)	State	Associated with California State University, Sacramento and is the major clearinghouse for sites of cultural significance in Sacramento and five surrounding counties. CAI compiles all archaeological and historic site information onto U.S.G.S. 7-1/2 minute topographic maps and personal computers. Conducts literature review of federal, state, local, or private development projects and forwards findings and recommendations to the County's Environmental Review and Assessment Section.
California State University, Sacramento (CSUS)	State	Trains students in archaeological theory and conducts research projects in Northern California. Only entity in County training students in site excavation methods.

<u>AGENCY</u>	<u>TYPE</u>	<u>FUNCTION</u>
Environmental Review and Assessment Department (ERA)	County	Conducts initial environmental studies and prepared negative declarations, EIR's, and suggestions for mitigation. All projects determined to be near or in areas of significant probability for sites are sent to CAI for further review. Often, further review and partial or complete site surveys are required.
Parks and Recreation	County	Manages the countywide parks system. An Archaeologic Inventory Plan was prepared in 1978 focusing on American River Parkway sites suggesting preservation methods. It is possible that a future park may focus entirely on Native American heritage.
Sacramento Museum and History Division	City	Sacramento City Department of Parks and Community Services manages the Sacramento History Center in Old Sacramento, collects and catalogs historical records and photos, reviews historic values of buildings countywide, and educates the public on Sacramento history.
Archaeological Conservancy	Private	Based in Santa Fe, New Mexico, this organization acquires archaeological sites to protect them from development. Criteria used for selecting the sites: 1) sites must be undisturbed and intact, 2) site is distinct and exhibits rare cultural attributes, and 3) the site has the potential to contribute significantly to prehistorical research. The Conservancy either manages its own parcels or sells the parcels to a public agency if the agency has enough personnel to effectively manage sites.

<u>AGENCY</u>	<u>TYPE</u>	<u>FUNCTION</u>
Central California Archaeologic Founda- tion (CCAF) and the Society for California Archaeology	Private	Professional organizations that seek to inform the general public and public agencies on the importance of preserving archaeological areas through education, lobbying and legislation. Provide scholarships to students of anthropology/archaeology.
Federal agencies		All Federal agencies must identify properties under their jurisdiction, consider historic properties when planning actions affect them, and document historic properties that cannot be preserved from development under the National Historic Preservation Act of 1966. Mather and McClellan Air Force Bases are the largest federal land managers in the County. Mather has no identified historic or prehistoric sites but McClellan has a potential historic site of approximately 30 structures which is under review.

An accessible network linking scientific knowledge and preservation strategies is lacking. Professional societies with annual meetings and periodic publications do offer a forum in which issues are addressed and ideas exchanged; however, there seems to be limited communication and coordination among local groups which hinders exchange and cooperation. Limited coordination among agencies and interest groups may also hinder surveying efforts and curtail cataloging and storage expansion efforts.

Professional opinion varies concerning what constitutes a significant site, and there is often disagreement of appropriate mitigation measures. Issues like whether sites should be left in tact, as is preferred by Native American Indians, in the case of sacred or burial grounds, or whether removal of artifacts is more appropriate, have several answers depending on who is asked and what criteria is used to guide decisions.

3. LACK OF ADEQUATE PROTECTION FOR SIGNIFICANT SITES

Both publicly and privately held sites face disruption, damage, and destruction from illegal collecting or improper or uniformed use.

Site locations are often kept secret to prevent artifact collectors and others from damaging sites. However, keeping site locations secret can inadvertently lead to destruction by people who are uniformed. Even planners do not always have ready access to the location data, making it difficult to utilize the cultural resources data based when approving development applications or updating community plans.

It is imperative to the science of archaeology that sites, yet to be studied remain untouched. Archaeology attempts to understand and interpret human behavior through reconstruction of events. Damage, destruction and removal of artifacts from sites diminishes scientific values by eliminating figures in the interpretation equation.

Public ownership does not necessarily guarantee protection of cultural resources. Public ownership may entail roads and trails to access sites, potentially increasing opportunities for vandalism. Nevertheless, federal, state, local governments, as well as private organizations have, in many cases, successfully preserved sites by purchasing culturally important areas for parks and open space. Private ownership can sometimes offer better protection of cultural resources primarily because of restricted public access. Some private landowners have a strong appreciation of and/or desire to protect cultural resources in such cases the site may be better preserved and protected in private rather than public trust.

However, limiting public access to sites can lead to a decrease in public interest in preservation efforts since the sites can't be publicly enjoyed. This could be especially important when trying to develop public support for funding cultural resources preservation.

4. LACK OF FUNDING

Lack of funding for protection and preservation has magnified many of the problems and issues surrounding cultural resources. Proper funding can help to ease some of these problems by providing the means to secure significant sites, develop Countywide plans for coordinating archaeological efforts, and possibly locate new storage and display areas.

Part of the attractiveness of Sacramento County comes from its rich historic past. The Chamber of Commerce promotes history. As a result, Sacramento profits from tourism, conventions, and new businesses. Yet, the County's financial support falls short of the amount needed for wise protection and management of cultural resources.

CONCLUSION

Preserving and stabilizing remnants of our past require we address problems leading to the rapid deterioration of our cultural resources. The lack of systematic methods for handling cultural resources, lack of consensus and coordination among agencies and interest groups, lack of protection for privately and publicly owned sites, and lack of funding should receive a greater commitment from the County. As unprecedented urbanization and population growth expands into the Twenty-first Century, the need to protect and preserve these resources so future residents will have the opportunity to learn and appreciate the important contributions of past inhabitants increases the urgency of the situation.

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